

LINES OF CLASS DISTINCTION

An economic and social history of
the British tramcar with special
reference to Edinburgh and
Glasgow

by A D OCHOJNA MA

A thesis submitted to Edinburgh
University in 1974 for the degree
of PhD

LINES OF CLASS DISTINCTION

**This thesis is the result of
work and thought undertaken
solely by myself**

**A D Ochojna
March 1974**

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To Maureen who accompanied me
to the depot
to Simon who joined us as the
tram was setting off
to Emily who boarded the car
just before the terminus

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SUMMARY

The tramcar has played a significant role in the development of Britain's towns and cities. Although it might seem obvious that transport provision and an extending housing frontier must be closely linked components of any urban growth model it is necessary to look behind the bald statistics of housebuilding and transport patronage for a meaningful appreciation of their interdependence. For this reason the thesis is concerned with four aspects of historical research, namely, technological innovation in the urban transport industry (the horse, then electric, tramcar and the petrol, then diesel, bus), urban growth, political choice, and personalities. The timing and speed of technological innovation in the British urban context can be explained in terms of the self-interested motivations of several major tramway promoters and the way in which they, and astute local political leaders, assessed the pressures of demand for a better living environment. Starting in the post Napoleonic War years, this desire for suburban living permeated down through urban society.

Suburbia, however, requires several attributes of its inhabitants - in the first instance sufficient income and time to spend on daily commuting. This fact alone explains the rise of the well-to-do omnibus suburbs of the 1840's and 1850's, but at least one other factor must be taken account of in later transport advances. Tramcars ran on

tracks laid into the streets and the upkeep of these streets was one of the major responsibilities of local authorities. The first wave of tramway companies sought the right to use and maintain a section of the public roadway for private gain and the Parliament of 1870 saw fit to grant councils the right to veto any tramway schemes in their area as a means of safeguarding the public interest and their own jurisdiction over public thoroughfares. This meant that in the tramway era of 1860 to 1930 any social group's ability to realise out-of-town living depended not only on the range of its disposable income and time budgets but also on the degree to which it could influence and manipulate the local political process to approve new tramway routes and extensions. These three preconditions for suburban living made the tramcar an essentially middle class form of transport which would only decay when the middle classes withdrew their patronage for it in the streets and their allegiance to it in the council chamber. The rise in car ownership in the 1930's witnessed just this phenomenon and the tramcar began its disappearance from the urban scene, not because it had become an inefficient mass mover, but because its fixed line of motion made it incompatible with the flexible traffic flow of the private motor car.

Tramways were introduced into Britain in 1860 and failed because the urban political mechanism was controlled by private carriage owners who were inconvenienced considerably

by the tracks of these early tramcars. A broadening affluence and the extensions of voting power produced a similar private mode ownership in the town councils of the 1930's, and again, the tramcar was rejected.

INTRODUCTION

The tramcar was primarily a phenomenon of the non-metropolitan towns and cities of Britain. Its contribution within the London area was muted by legal barriers, the number of competing transport modes, and the very size of the city itself. For these reasons the London tramway scene is mentioned as and when it has direct relevance and bearing to the national situation. Its size made it sui generis, and fortunately, the story of its transport has been recounted by such as T C Barker and M Robbins, J R Day and others.

The tramway histories of Edinburgh and Glasgow were chosen as case studies for three reasons. Firstly, I know both cities fairly well, especially the former, and such acquaintance aids one's appreciation of the subtleties of local politics and tramway developments. Secondly, in terms of tramway micro-economics the tramway management systems as pursued over the years of tramway operation in the cities give examples of every type of management combination possible from outright local authority ownership and running to pure private enterprise control. Finally, in terms of the tramcar's development and social effects, the cities offer remarkable extremes: Edinburgh has an atypical cable traction system which restricted suburban developments whilst Glasgow finished up with one of the most extensive tramway networks in the world. Between them, these two Scottish cities provide enough detailed

and personalised data to confirm and advance hypotheses drawn from national sources.

I thank Dr Wray Vamplew for his academic guidance and personal friendship, the archivists of Edinburgh and Glasgow Corporations for their efficient co-operation, Mrs Linda Boys and Mrs Vivian Muldrew for typing up my work, and the staff at Cranfield Centre for Transport Studies, whose constant interest and encouragement has resulted in this presentation finally being made.

Cranfield

March 1974.

Chapter One.

Early Nineteenth Century Road Transport in Towns.

"That City's atmosphere is dark and dense,
Although not many exiles wander there,
With many a potent evil influence,
Each adding poison to the poisoned air;
Injections of unutterable sadness,
Injections of incalculable madness,
Injections of incurable despair."

J Thomson. "The City of Dreadful Night"
1870-73.

Almost half the population of England and Wales lived in large towns in 1871.¹ A lot of people did not seem to like doing so. Throughout the nineteenth century urban areas sprawled at their edges and imploded at their centres. It became more and more difficult for inhabitants to reconcile the two functions of their towns as places to live in and places to work in. An expanding commercial nexus was spreading over city centres and amplified existing congestion which in turn increased the concomitant sanitary and social problems for both rich and poor. The situation was further aggravated by the physical constraints set on the size of towns by the maximum commuting distance,

¹ C M Law in Transactions of the British Institute of Geographers. 1967 Vol xli. Quoted by G Best Mid-Victorian Britain 1972 p6.

which for the majority of people until the 1870's was a manageable walk of say two miles to and from the centre.¹ Indeed, if no such restraints existed, then by definition, there could not have been urban congestion of the type described by Mayhew, Denton and others.² The history of urban transport tells the story of how the citizen repeatedly escaped from the city and how the city in turn recaptured its recalcitrant inhabitants.

If the town of the nineteenth century was dirty, unhealthy and noisy, if it was the home of "struggle, indifference, loss of purpose, loss of meaning,"³ it affected the rich

¹ In 1861 no provincial town apart from Newcastle had a municipal area of over 6000 acres (see Fig 713). Overlooking the fact that municipal areas and built-up areas are not closely related, and assuming the shape of the town to be circular, the radius of a circle of 6000 acres is roughly 1.75 miles. This figure gives an indication of the commuting constraint and should be considered along with the Le Corbusier observation that few urban trips are effected in straight lines. Note the similarity of this distance with that pointed out by Engels, see below p.11.

² H Mayhew London Labour and the London Poor. 1861
W Denton Observations on the Displacement of the Poor by the Metropolitan Railways and by other public improvements. 1861.

³ R Williams The Country and the City 1973 p 239.

only incidentally. They could move between their town and country houses as business dictated, and those only slightly less fortunate stayed in their clubs on occasion or travelled in daily by private carriage or short-stage coach.¹ The first transport services to ply for indiscriminate hire along a fixed route were inaugurated in the 1820's, although it was not until 1829 that George Shillibeer's operations assured for the omnibus an encouraging future.² His buses ran from Paddington Green to the Bank at fares of one and sixpence inside and one shilling outside. Such fare levels, and his provision of newspapers and magazines for passengers, serve to underline the fact that his service was public in theory rather than in practice. Regardless of the objections of "the aristocratic and wealthy residents of Paddington Green"³ their area was soon a centre of the omnibus

¹ J Hibbs A History of British Bus Services 1969 p 17.

These coaches were more like taxis with most of the seats reserved for regular travellers.

² The earliest omnibus service was that connecting Edinburgh with Leith via Leith Walk which started operating in 1610. In 1824 John Greenwood ran a service from Pendleton to Manchester; see Hibbs op cit p 25.

³ H C Moore Omnibuses and Cabs 1902 p 14.

business "for upwards of 195 omnibuses daily ply from that suburb to various parts of London".¹ Shillibeer attracted competition immediately: in May 1830 London had 39 omnibuses,² in 1839 there were 620, and by 1850 there were around one thousand.³ The commuter had arrived: "In the mornings, from the hour of eight to ten, the various short stages and omnibuses are pouring in, bearing with them the merchant to his business, the clerk to his bank or counting house, the subordinate official functionaries to the Post Office, Somerset House, the Excise or the Mint, the Customs House, or Whitehall. An immense number of individuals, whose incomes vary from £150 to £400 or £600, and whose business does not require their presence till nine or ten in the mornings, and who can leave it at five or six in the evenings all in fact who can, now endeavour to live some little distance from London. This feeling is extending itself rapidly

¹ Chambers Edinburgh Journal. Vehicular Statistics of London - 1. 14.6.1845. Vol 3 No 76 p 371.

² Hibbs op cit p 27.

³ T C Barker and M Robbins History of London Transport Vol 1 1963 p 59 and p 63.

J E Bradfield in The Public Carriages of Great Britain 1855 p 41 puts the figure at around 1000 in the 1850/1855 period.

as omnibuses multiply".¹

This multiplication of vehicles did not lead to commensurate improvements in service. The 1842 reduction of mileage duty from threepence to three halfpence per mile run did little to erradicate the practice of racing and dawdling buses in an attempt to continually cram their inners with customers. Nevertheless the competition did lower fares so that by the early 1850's the average full fare was sixpence, but this still kept the bus a "middle-class conveyance".² The mid-1850's witnessed a dramatic restructuring within the industry. The 1851 Exhibition attracted many visitors to London and produced over-competition among omnibus proprietors in following years. Added to this, the rise in fodder prices generated by the Crimean War effort resulted in a state of financial insecurity and some amalgamations ensued. It was when the industry was in this situation that the Compagnie General des Omnibus of Paris bought over 600 London omnibuses in 1856 under the name of the London General

¹ The Penny Magazine. A Looking Glass for London -
VIII. 31.3.1837. Vol V p 116.

² C E Lee The Horse Bus as a Vehicle 1962 p 22. See
also H Perkin The Origin of Modern English Society 1780-
1880. 1969 p 418.

Omnibus Company.¹ This new monopoly produced no returns for the customer. The company had spent over £400,000 in buying the vehicles and their stud at £150 each and it was loathe to introduce major changes; indeed the failure of their bus design competition held in 1856 showed that major changes were hard to find. Fares remained high and omnibuses remained uncomfortable.

"Within, the omnibus is nothing but a couple of narrow shelves, on which passengers are parked like trussed fowls on the ledge of a poulterer's window; without, mortal men are set to grind to a 'knife-board'."² "If you are fond of asphyxia, you should ride inside an omnibus on a sultry summer day; a bouquet of fusty straw will contribute much to your gratification, and you may faint away amidst appropriate sights and sounds."³

To be fair to the omnibus, it worked under many disadvantages. In London the narrowness of City streets forced the vehicle to be equally narrow and limited its carrying

¹ For details see Barker and Robbins op cit pp 69-98 Hibbs op cit pp 30-31, and J R Day The Story of the London Bus 1973 pp 15-24.

² Times 14.8.1856.

³ Chambers's Journal 14.4.1860. Vol 13 No 328 p 229.

capacity to around twenty passengers. The constant stopping and starting to pick up and set down passengers at will, either the passengers' or in some cases the drivers', placed heavy strain on the horses so that each vehicle had its own stud of eleven or twelve animals to be interchanged throughout the working day. For the 1850's it has been estimated that it cost almost £470 per annum to feed an omnibus stud,¹ and total horsing costs were significantly higher because the horses themselves had a useful life of but four to five years. It was this combination of low loading capacity and high working expenses which produced the vulnerable position of the 1850's, and the Crimean War had the double effect of raising fodder prices and capital charges as horse prices rose in response to the army's requisitioning.² The industry countered by easing its tax commitments. In 1855 it managed to get the mileage duty lowered to a penny per mile and this meant a saving in the region of £30 to £40 per annum per vehicle. In the following year the London General sought the abolition of tollgates in London, but pressure of Parliamentary business saw it come to nought. Such a commutation of toll charges could have saved the London General some £14,000 per annum and the London industry in toto some £23,000 per annum.³

¹ Barker and Robbins op cit p 39.

² Select Committee on Metropolitan Turnpike Roads. PP 1856 Vol XIV Q 1410.

³ *ibid* Q 1659

As the 1850's progressed it became apparent that the omnibus had to improve its efficiency if it were to survive. Further economies were unforeseeable in the areas of working expenses, capital charges and tax payments, and so the remaining avenue of salvation lay through increasing the productivity of the bus itself by increasing its carrying capacity and in turn its revenue earning capability. In 1857 the London General Omnibus Company decided to do just that; The London Omnibus Tramway Company was registered by them to lay tramlines in the city.

The concept of street railways was not new to the French directors. The first urban tramway was opened in New York in 1832¹ to be revived by a French engineer Alphonse Loubat in 1852² who then brought the tramway to Paris in the following year. The low resistance of iron wheels on iron rails raised the pulling power of the horse by a factor of two to three.³ However such technical advances were overwhelmed by the social and physical characteristics of London; the Metropolis had neither the poor street

¹ The New York and Harlaem Railroad was opened on November 26 1832. See C E Lee The English Street Tramways of George Francis Train. Journal of Transport History 1953/54 Vol 1 p 20.

² D K Clark Tramways: Their Construction and Working 1st edition 1878 p 6.

³ ibid p 4.

surfaces of American cities nor the broad avenues of Paris, and the London General met the opposition of a carriage-owning Parliament. Although the streets of London showed "no more signs of provident arrangement for the order of traffic than they did in the days of the Plantagenets",¹ their bill seeking the power to lay tramlines in the city was thrown out in March 1858 largely as a result of the efforts of municipal interests and the Commissioner of Public Works, Sir Benjamin Hall. He thought it "a monstrous proposition to ask for permission to appropriate sixteen feet of a highway for the purpose of a private omnibus company".² Rails in the street would be a hazard for the thin wheels of private carriages, and the actual construction of the lines involved the road surface whose maintenance was the prime *raison d'être* of the local vestries. Internal political problems within the company prevented it from pursuing its aim, much to the disappointment of those who were aware of the overall transit problem of the city. The social costs of an inefficient transport service were being recognised: "Suppose a contrivance that might save but half an hour a day even to only 100,000 of our population and valuing their time at sixpence per hour, the economy per annum would be little short of £500,000, and this without reckoning any advantage in the transmission of merchandise and the non-delay of horses. It is palpable therefore, that millions are annually sacrificed through the want of some Parliamentary

1 Times 14.8.1856

2 Hansard 15.3.1858. 3rd series Vol 149 col. 175

and municipal recognition of the necessity of encouraging any feasible scheme that may lessen such gigantic national waste."¹

In the provinces the situation was much better. When Andrew Menzies of Glasgow spoke of his omnibus business meeting "the demand which has sprung up for houses of a superior class in the suburbs of the city",² he was in fact speaking for all bus proprietors throughout the country. Their operations linking Headingly and Roundhay with Leeds, Trinity and Newington with Edinburgh, Newhall and Edgbaston with Birmingham. In many instances suburban estate developers subsidised such omnibus routes so as to ensure reliable access to their lands from town centres. In Glasgow the Kelvinside Estate Company assisted John Walker in the financing of his service to Kelvinside which started in 1847;³ in London builders in Islington and Holloway in 1856 were "paying money for the purpose of having omnibuses up there".⁴ This development/transit

¹ Times 26.2.1858.

² Appendix by A Menzies in J E Bradfield op cit p 62.

³ M A Simpson Middle class housing and the growth of suburban communities in the West End of Glasgow 1830-1914 Glasgow University B.Litt. thesis 1970 p 96.

⁴ Select Comm. on Met. Turnpike Roads op cit 1856.

Q 1391-1393.

interaction heralded the onset of the class differentiated suburb, so well described by Engels in 1845. "Manchester proper, all Salford and Hulme, a great part of Pendleton and Chorlton, two-thirds of Ardwick, and single stretches of Cheetham Hill and Broughton are all unmixed working-peoples quarters, stretching like a girdle, averaging a mile and a half in breadth, around the commercial district. Outside, beyond the girdle, lives the upper and middle bourgeoisie, the middle bourgeoisie in regularly laid out streets in the vicinity of the working quarters especially in Chorlton and the lower lying portions of Cheetham Hill; the upper bourgeoisie in the remoter villas with gardens in Chorlton and Ardwick, or on the breezy heights of Cheetham Hill, Broughton and Pendleton, in free, wholesome country air, in fine, comfortable homes, passed once every half or quarter hour by omnibuses going into the city."¹

Whereas the London of the 1850's had an omnibus system, the towns had omnibus routes. London had a fleet of around 1000 buses while Glasgow could show only forty and Manchester forty-five.² Such small fleets supplied the needs of the middle-class commuter rather than providing

¹ F Engels The Condition of the Working Class in England 1845 Panther ed. p 79.

² Bradfield op cit p 62 and p 65. In terms of built-up area, London was some 13 times larger than Glasgow and over 7 times the area of Manchester. See The Impact of Railways on Victorian Cities 1969 §.290

intra-city transport.¹ Provincial town centres were still small enough to allow the businessman and his messenger to walk to their appointments without any appreciable waste of time.

The commercial climactic of the 1850's and 1860's was literally to sweep all this away. The upsurge of commercial and professional occupation, and the ruthless push of railways into town centres meant that towns were to experience the growing pains their much larger capital had been labouring under since the beginning of the century. These decades of concentrated urban change altered dramatically economic and social cost structures so that eventually the need for some form of higher capacity public transport mode was recognised. It was while such trends were in their infancy that the tramcar was introduced into Britain, and as a consequence, the affair ended in glorious disaster.

Although it was not strictly an urban route, W J Curtis, an engineer who had been to Paris, opened a tramline along

¹ Not till after 1879 was there any intensification of inner routes in Leeds. See G C Dickinson Development of Road Passenger Transport in Leeds 1840-95. Journal of Transport History 1959/60 Vol 4 p 218

Liverpool Docks in March 1859.¹ A Harbour Board toll of sixpence per journey soon finished off the scheme, and his subsequent attempt of 1860, this time in Islington,² was overshadowed by events being acted out at an entirely different level of salesmanship and promotion.

George Francis Train was an extrovert. He was an American businessman who travelled the world selling anything in general and himself in particular. Among his many exploits, he got himself involved in the Australian miners' revolt of 1854, the first Fenian convention in Philadelphia in 1865, the Marseilles Commune of 1870 (while sailing round the world in eighty days), and he ran for the American Presidency in 1872. In one of his campaign speeches he said he thought that many people had the wrong impression of him, as impulsive and impressible "as if I were some erratic comet, rushing madly through space, emitting corruscations of fancifully coloured sparks, without system, rule, or definite object."³ His

¹ Letter by Curtis in the Journal of the Society of Arts 5.10.1860 Vol 8 p 783.

² loc cit.

³ G F Train My Life in Many States and in Foreign Lands 1902 p XLV

claims to numerous inventions,¹ although not exactly placing him in the heavenly ether, certainly point to his being firmly ensconced in the clouds. He was certified insane in 1873 and was content to remain so until his death.²

In the late 1850's Train was raising money for the Atlantic and Great Western Railroad, and while in Philadelphia in 1858 negotiating railroad concessions for the Queen of Spain, he took an interest in the tramways of that city. Impressed by "the great convenience these railways must be to the businessman and to all workers"³ he came over to Britain in the following year as a front man for a group of American promoters - their connections with the Atlantic and Great Western makes the term speculators more appropriate - to capture the 'untrammled' British market.⁴

¹ He claimed to have invented the ink well, perforated sheets of stamps, tinned salmon, tea packets, and the rubber on the end of a pencil. However his contention that Jules Verne 'wrote fiction of my fact' (ibid p X) may well be true since he held the record for traversing the globe in eighty days in 1870.

² This was a legal move to acquit him of obscenity charges brought against him in connection with the trial of V C Woodhull. See Observer Colour Supplement 5.11.1972

³ G F Train op cit p 259.

⁴ There are references to American promoters in the Liverpool Chronicle 4.2.1860 and the Birkenhead Times 21.4.1860.

Following the advice of an MP friend and his engineer John Samuel who had been involved in the London General promotion of 1857/58, Train avoided London and decided to try Liverpool. This town was chosen for the simple reason that he knew the place since he had worked there for his uncle's shipping company in previous years. The Corporation gave him little encouragement¹ and so he crossed the Mersey and proceeded to woo the Birkenhead Commissioners. He met with success; both the town surveyor and the convenor of the committee set up to investigate his plans were impressed by the potential his tramways held out to increase the property values of the suburbs. The easier communication with Liverpool from the pier could attract more of the city's population to reside in the area of Birkenhead. Train himself saw this trial as a loss-leader into a tramway fortune; he took upon himself all the financing and committed himself to lifting the lines should the town find them to be unsatisfactory. The line

cont. Among them was J McHenry who was involved deeply in the Atlantic and Great Western Railroad; the Railway Times saw him as nothing more than a financial trickster. 15.5.1886 Vol 49 p 626.

¹ The Corporation did relent in 1861 when Liverpool Road and Railway Omnibus Company opened a line in West Derby; it was later closed down because of obstruction. See S A Munro Tramway Companies in Liverpool 1859-1897. Transactions of the Historical Society of Lancashire and Cheshire 1967 Vol 119 p 182.

was opened on August 30th, 1860 and ran just over a mile from the Liverpool ferry landing stage to Birkenhead Park at the return fare of sixpence. It was to be "the rich man's comfort" and "the working man's luxury".¹ Even although none of the crowned heads of Europe, nor the Pope, accepted their invitations to the opening ceremonies, as an introductory offer it was a great success.

"Travelling by one of Mr Train's carriages, as contrasted with one of our ordinary omnibuses, is like quitting a narrow and confined room for a commodious and well-ventilated apartment. To ladies especially it would be a great boon that they should be brought into general use; but whether Mr Train will be able to accomplish that object yet remains to be seen."² This doubt anticipated the friction that was bound to arise between the carriage and non-carriage-owning sections of the community as already displayed in London.

"Now it is found we have a high-class locomotion in carriages for the rich, and low-class locomotion in the costermonger's cart for the poor, but no real middle-class locomotion Locomotion is being picked up and

¹ Report of the banquet given by George Francis Train in Birkenhead 30.8.1860 BM 08235 f 8

² Times 31.8.1860.

set down in daily and hourly business, in visits, and for ladies in their shopping. Middle-class locomotion has been attempted to be supplied by omnibuses - things hybrid between carriages and waggon, but with too much of the waggon. They have been tolerated. In fact ... this middle is much nearer the high than the high thought, and they want more of the carriage than the waggon."¹ The Honourable Grantley Berkley on the other hand decided that the tramcar was "tyranically democratic."²

With the initial success behind him Train went to London, but approached local vestries rather than the City Commissioners. Again, by offering to pay all expenses, he managed to lay down three routes and engender a great deal of powerful opposition. In a valid reversal of the Birkenhead suburban property owners' dreams of value appreciations, the central residents of London's inner suburbs feared a loss in value,³ and the London General fought hard to protect its transport monopoly. Throughout 1861 and 1862 his three lines were laid, opened, and taken up.⁴ The lines were found to be a great nuisance

¹ Liverpool Albion 24.9.1860.

² Liverpool Mail 4.2.1860.

³ C Greene and G P Rippon Street Railways in London 1860.

Train lost his case in Marylebone on 'class interests only.'

⁴ The Marble Arch to Porchester Terrace line lasted from 23.3.1861 until July 1861; the Victoria Street line lasted

to traffic because into the busy streets of London Train introduced the American step-rail, a six inch flat strip of metal with a raised outer edge some three-quarters of an inch above the surface of the street designed to keep the unflanged tramwheel on the broad metal track. Carriage wheels were broken, omnibuses collapsed, and eventually someone was killed. All three lines had charges of public nuisance brought against them, and all three were proven. Following the advice of the judge to the Kennington line trial Train sought legal status for his tramways in Parliament in 1861. His bill tried to achieve nationwide coverage through private bill procedure and was thrown out on standing orders. He left Britain in disgust. In his eyes a Confederate-biased Parliament defeated him because of his Unionist speeches, and he turned to prevent English blockade running to the South during the Civil War. "This fight was to cost me the opportunity of making a fortune of perhaps \$5 million, by upsetting my street-railway projects."¹ He was not the first businessman, nor the last, to explain away a business failure under the guise of political martyrdom.

cont. from 15.4.1861 until June 1861; and the Westminster Bridge to Kennington Gate line lasted from 15.8.1861 until April 1862. See Lee Journal of Transport History Vol 1 op cit pp 97-108.

¹ Train op cit p 272.

All of Train's central lines, those in London, were swept away, but his more suburban ones, in Birkenhead, the Potteries and Darlington,¹ survived. In congested streets the tramcars' advantages of speed and comfort were very much curtailed and the disadvantages of the step-rail and vehicle inflexibility (its inability to weave in and out of traffic) were highlighted. Nevertheless, in 1862 Britain knew all about the tramcar, and any would-be promoter knew the problems he had to overcome. Those in power, both at national and local level, were those more likely to own carriages and so any suspicions of traffic inconvenience would be exaggerated; local authorities would have to give up a certain amount of jurisdiction over their streets; and the concept of the tramway itself involved a use of the streets never before encountered in that a private party sought to 'monopolise' a portion of them for profit. But the tramcar had one overriding advantage; the double-decked car at Birkenhead carried forty-eight passengers and was pulled by two horses while the London omnibus could carry only twenty-one passengers and the provincial three-horse bus thirty to forty. The tramrail, at two thousand pounds per mile to lay could increase the carrying potential of the horse by 100%. In turn, however, it was this capital investment which prevented tramway building in the early 1860's.

¹ The Darlington line was taken up in 1865 because it was built on the wrong side of the road.

The nature of urban passenger transport industry was; essentially small-time with the majority of bus proprietors owning less than ten vehicles,¹ and simply operating a handful of routes in any one town.² The industry did not have the necessary surplus capital and only its largest unit, the London General, had had enough to risk a tramway venture. To lay rails required engineers, law agents, contractors and other such expertise totally above the requirements of the omnibus industry, both technically and financially. But, of greater importance still, for a tramway to be successful in overcoming omnibus competition, it would have to serve all the major routes in a town or service area; if a tramway passenger had to change to an omnibus somewhere along his route then the advantage of speed and comfort would be undermined significantly.³ What these considerations amount to is that

¹ In Glasgow, the major omnibus proprietor had only nine buses in the 1860's. C A Oakley The Last Tram 1962 p 13.

² " By the end of the 1850's, the principle of omnibus operation in Birmingham had been established with an individual owner working one or more of each of the main roads out of the town." A G Jenson Early Omnibus Services in Birmingham 1834-1905 p. 4.

For an equivalent account of Sheffield's transport history see J E Vickers From Horses to Atlanteans 1972

³ An example of this occurred in Edinburgh in 1894 with the onset of the 'Pilrig Muddle' (see Chapter 5) when a route was split between two companies and passengers had to change cars half-way. One company's loadings on the route fell from almost 46,500 per week to a mere 20,000 as a result.

the industry in 1860 was not suitably structured for the acceptance of the tramcar. The economic and technical requirements of tramway operation meant that the bus proprietor had little chance of gradually moving into tramways in the same way that he had gradually built up his bus fleet. To introduce tramways involved a large capital investment and needed a demand heavy enough to reduce capital charges to a level capable of competing with existing bus services costs. Such a demand intensity did not exist generally in the early 1860's.

The demand function for transit had to shift appreciably to the right for tramways to become financially attractive. The tramcar did not reduce working expenses per vehicle mile run, but it did increase its potential earning power; it cost the same to keep a stud of horses for an omnibus as for a tramcar, but the former had a capacity of twenty passengers and the latter nearer fifty. Nevertheless, this increased capacity was in finite units, and simply to cut expenses through replacing a fleet of omnibuses by a fleet of half the number of tramcars would only result in halving the service frequency since both vehicles had the same average speed of around six miles per hour. To reduce frequency and jeopardise consumer patronage was a retrograde step. In fact, the decision to replace buses with tramcars while maintaining service frequencies depended not on demand, but on the rate of change of demand. The faster demand increased the quicker

the capacity of the tramcar would be utilised; the quicker demand increased the higher became the marginal costs of expansion in that ten buses instead of one, say, would have to be bought, and this in turn reduced the opportunity costs of tramway investments.

On the revenue side, such increased charges could not be covered by higher fares. One of the major promotional devices in forthcoming tramway schemes was to paint the tramcar in the robes of the public spirited liberator freeing the populace from the vagaries of omnibus pricing.

The tramcar's characteristics of increased capacity at higher overall charges per vehicle, and the private enterprise system of choosing those investments with the shortest pay-back periods meant that the tramways could only become realistic propositions once the structure of the existing omnibus industry had shown itself to be totally inadequate to meet some changes in demand and supply conditions. The tramway schemes of 1858-1862 were premature. They were the result of one group's idea that because America was ready for the tramcar so was Britain. As it was, within the next few years the social and commercial parameters changed and a General Tramways Act was passed in 1870. What happened between 1862 and 1870 to produce this volte-face? What altered urban and economic and social values so that the tramcar was deemed necessary? Perhaps we need look no further than

the tramcar's big brother; although among several forces, railway companies' activities at this time were not insignificant in accelerating the questions of urban living into a critical phase.

By the 1860's the major railway companies were well enough established to play down competition through fares and turn their attentions to the provision of better services.¹ The most obvious way of going about this was to improve terminal facilities by moving them closer into town centres.² As the railways ploughed inwards thousands of the poorer classes were evicted from homes swept aside by the bow wave of the approaching track.³ Ideas that these refugees be rehoused by the railway companies were never implemented with any enthusiasm, and the displaced were left to cram into nearby slums. "The

¹ H Pollins Britain's Railways 1971 p 73.

² "The outcome of the railway companies' shadow-boxing over fares, combined with their real competition over sites, facilities and territory, was a renewed and determined invasion of the central core of the Victorian city in the 1860's." J R Kellett The Impact of Railways on Victorian Cities 1969 p 69.

³ Over the period 1859 to 1867 37,000 people were displaced by railway schemes in London. See H J Dyos Railways and Housing in Victorian London. Journal of Transport History 1955/56 Vol 2 p 14. See also G E Cherry Urban Change and Planning 1972 p 41.

poor are indeed displaced, but they are not removed. They are shovelled out of one side of a parish, only to render more overcrowded the stifling apartments in another part."¹

These new termini accelerated the growth of central warehouse and commercial complexes which increased the demands for urban land and produced rising rents. As land values appreciated, the economics of lower suburban rents, achieved at the cost of commuting measured in terms of time and money, became more worthwhile. But for a vast number of city dwellers such considerations were totally irrelevant; lower suburban rents were still outwith their financial means and even the cost of bus or train fares was an effective deterrent. They had to stay, not only to live in cheap squalor, but to exploit the proximity of casual employment and the opportunities for female labour.

As the central areas ceased to be so residential, pressure was placed on the outer shells of towns to absorb more population. "The central parts of Britain's cities thus through the '50's and '60's became gradually more tidy, business-like, and consciously impressive. The quantity of people living in them usually diminished, although the overcrowding of those living in them usually got worse."²

¹ Denton op cit p 10

² Best op cit p 64.

Within the physical constraints of the urban area the middle-class /working class barriers were being infiltrated from below. Those who could afford it left for further afield, and those who couldn't wished that they could. The process of house subdivision at this time shows the pressure for accomodation experienced by the poor, and the desire to leave expressed by the not-so-poor. By the 1860's the Victorian city had reached the limits of its growth under existing transport restraints. "Beyond the Metropolis there was not when this century began a single town in England of 100,000 people, and only five exceeded 50,000: there are now 28 above 50,000. The result of this change is not only that the class of town people is enormously increased, but that the old, close-packed little towns are now centres built round on every side, open nowhere to air, and, being no longer agreeable to the rich, are abandoned by them for the pleasanter outskirts. The successors of these rich are occupying the larger houses at the rate of a family to each room, and a population for which the houses werent intended and quite unfit, has been created whose surroundings are truly degrading to the adults and ruinous to the children."¹

This filtering-up phenomenon acted more as a trigger than

¹ H J Hunter On the Housing of the Poorer Parts of the Population in Towns. Appendix 2 of the Eighth Report of the Medical Officer of the Privy Council 1865 PP 1866

as a gradual pressure, by introducing social factors into the purely physical problem of housing shortage. As the richest moved out to the suburbs, they left behind their social aspirants to confront the envoys of the lower classes; these remaining middle-class aboriginals saw their leaders deserting them and the Huns settling in. They desperately wanted to follow into greener pastures. In this way "the growth of the residential suburb was a process in which social aspirations and prejudices played a part as important as strictly economic ones."¹ It might have been the poor who were displaced, but it was the middle-class, with their threatened standards of decency, housing and behaviour, who suffered. All the more so as such suburban living became within their financial capability, yet no means existed by which they could all travel to and from the central business areas.

Although the railways may be only an easily defined component of this urban upheaval, their activities have been emphasised because the expansion itself had important repercussions on the tramway industry. "The promotion of urban schemes, though partly a response to traffic demands, was also given a particular impetus by contractors, engineers and solicitors, all directly interested parties, and likely to profit from the stirring up of the larger established companies' dormant rivalries

¹ Kellett op cit p 419.

and anxieties."¹ When the railway boom broke in 1866 these 'interested parties' were out of a job, and suddenly tramway promotion took on the air of a profitable venture. Railway engineer W Bridges Adams had been quite correct in 1857 when he claimed that there was no interest in tramways in Britain at that time because "the whole thing is so simple and easy, and the outlay needed so small, that there is no scope for either lawyers or engineers."² In 1866 railway promoters had no scope at all.

After 1866, the character of railway investment changed; dividends were low because "the new lines laid down since 1864 have evidently cost a great deal of capital, and have not brought in a corresponding amount of traffic, and that traffic has been worked at a high rate of expenditure."³ Railways were no longer blue-chip investments, but the ensuing spate of company amalgamations

¹ *ibid* p 78.

² W B Adams On the application of rails for horse transit in the streets and environs of London, and also for railway branches. Journal of the Society of Arts 13.2. 1857 Vol 5 p 190.

³ Herapath's Journal 5.12.1868 Vol 30 p 1238.

may have had more influence on the small investor. Particularly in the '60's large scale amalgamations and leasing arrangements were negotiated with the result that by 1871 twenty-eight companies controlled 80% of Britain's track mileage.¹ Railway companies were losing their appeal for the local investor² who was keen to attend shareholders' meetings nearby and generally take an interest in an enterprise he could see and touch, whose everyday problems he could understand, and whose directors he knew or at least had good reason to respect.

If the railways were labouring under financial difficulties, road based transit modes were suffering from technical ones. The housing boom of the 1860's threw great strains on the omnibus system. Growing suburbs demanded increased service frequencies as high as one bus every three minutes. The nature of the business was changing; in Glasgow the number of buses operating in the city rose from forty in 1855 to one hundred in 1872:³ in Leeds routes were increased during the period 1863 to 1879;⁴ in Manchester

¹ H J Dyos and D H Aldcroft British Transport 1969 p 157.

² This does not imply that railways were financed locally in the main; see S A Broadbridge The Sources of Railway Share Capital in M C Reed (ed) Railways in the Victorian Economy 1969 pp 184-211.

³ Oakley op cit p.20.

⁴ Dickinson op cit passim.

omnibus proprietors amalgamated into the Manchester Carriage Company in 1865 to facilitate route extensions;¹ in Edinburgh routes and service frequencies increased markedly in the latter half of the '60's; and in Birmingham the Birmingham Omnibus Company was started in 1869, the first new omnibus operation in the city for the past thirty years.² Public transport was becoming more public and at the same time private transport was becoming more private. The numbers of light two-wheeled carriages - "the vehicles of the middle classes par excellence"³ - had grown very quickly through the years 1840 to 1870, but then slowed down due to "physical restraints on the supply side, in short, to problems of horsefeed and carriage space,"⁴ urban stabling was becoming too expensive. Omnibus services, too, were facing rising costs as a shortage of supply witnessed the price of van-horses and cart-horses go up by 25-30% over the middle decades of the century.⁵ Bus operators were facing a rising demand

¹ N J Frangopulo Rich Inheritance 1962 p 58.

² Jenson op cit p . 6.

³ F M L Thompson Victorian England; the Horse Drawn Society 1970 p 16

⁴ ibid p 17.

⁵ ibid p 14. The price of LGOC horses rose from just under £24 in 1869 to around £33 in 1872; see House of Lords Select Committee on Horses PP 1873 Vol 14 Q 151. Since the Crimean War the Army had stopped buying three year olds in preference for more mature four year olds. Foreign buyers had moved in and by the 1870's the breeding stock

and an inability to meet this demand because horses were too expensive or simply not available. Here was an excellent opportunity to utilise the economies of the tramcar; frequency and horse expenditures could be maintained while capacity was increased.

The 1860's railway boom provided the nascent tramway industry with its three primary requirements. The increased overcrowding, both in living and travelling accommodation, magnified the demand for middle class commuting; its financial collapse released the technical and legal resources; and the changing nature of railway shares meant that capital was available, in many cases made so by people eager to leave for distant suburbs. The combination of high demand and capital availability should have produced speedy tramway building, but the remaining factor, experienced railway men eager to recoup earlier losses or maintain pre-1866 incomes, put early promotions ~~under~~ a great deal of suspicion.

In 1864 John Noble, lawyer and Liberal activist,¹ went into partnership with contractor C F McDonald and set

cont. was becoming alarmingly low since the military preferred mares.

¹ There may be some significant connection between Liberalism and the tramcar, explainable in terms of the rise of the single class suburb. It is interesting to note that John Vincent's The Formation of the British Liberal Party 1857-1868 1966 spans exactly the first phase of tramway promotion in the country.

about promoting tramways in Liverpool and London. In November 1865 they laid a section of trial rail along Castle Street in Liverpool. The rail, termed the 'crescent rail' had been developed by a Nathaniel Vail of America¹ and it was specially designed to overcome the drawbacks of traffic obstruction which had been such a characteristic of Train's step-rail. The experiment proved to be a success and in 1866 the promoters² went to Parliament with a petition in favour of their bill signed by seven thousand Liverpudlians.³ However, Noble's inexperience as a Parliamentary agent made itself apparent as both this bill, and one for London,⁴ were thrown out in 1866 and 1867 on infringements of standing orders relating to absence and subsequent inaccuracy of plans.⁵ Over and above this, the London General Omnibus Company did not take the threat of London tramways lightly, and Noble's

¹ PRO BT 31/1197 Par. 3.

² They were all London-based; three were financial agents, two were clerks, and one was an engineer.

³ J Noble and Co Liverpool Tramways; Explanatory Statements and Maps 1866 BM CT326.

⁴ PRO BT 31/1194 Its seven promoters included five from the Liverpool venture and all were based in London.

⁵ J E Bradfield Tramways or Railways on Metropolitan Streets will be Mischievous and Dangerous Obstruction and Nuisances Published in answer to Noble's pamphlets in 1866, 1867 and 1868. BM 08235 c 4.

defence of his tramcar against omnibus opposition demonstrated the changing emphasis that society was placing on its urban problems. In 1865 he described the tramcar as a vehicle which offered greater comfort and lessened traffic congestion, and by using horses more effeciently, it would lower fares, fares to be fixed by Parliament and not subject to the whims of private omnibus proprietors.¹ This final statement of intent was vital if the suburban dweller was to be attracted to virtual dependence on some private enterprise transit scheme. In later defences, in 1867 and 1868, Noble widened his argument to the level of urbanisation in general; "the tramway provides locomotion without disturbing a single dwelling, thus obviating the overcrowding which is the inevitable result of railway demolition."² The tramcar was being put forward as the means by which the middle class could escape the city with a clear conscience. It was even suggested that the working class might share their escape routes, but this was more of a promotional exercise than a realistic proposition. Even Henry Davies, who in 1861 was advocating the council house estates of the 1920's to the Earl of Derby, saw his connecting tramways as being used in the first instance "by small

¹ J. Noble and Co Tramways as a means of facilitating the street traffic of the Metropolis 1865.

² J. Noble & Co Metropolitan Tramways; Explanatory Statements and Maps 1867 BM CT326

clerks, small traders, warehouse-porters, artisans, and the better class of mechanics"¹

Noble's operations were taken over by an Anglo-American syndicate, and their expertise ensured the passing of the Liverpool Tramway Bill in 1868.² They had the full support of Liverpool Town Council, and the cholera epidemic of the previous year could have done little but raise the social benefits of improved public transit facilities. Nevertheless, the promoters paid a high price for their franchise. The company were given exclusive use of the rails for eighteen months, after which time any company could use them at a toll to the promoters set by the corporation - a curious amalgam of railway and canal pricing procedures. The company itself sought to maintain the roadway to a width of eighteen inches on either side of the tracks so that they could control the repair of the road/rail interface at a high standard, enough to prevent accusations of traffic obstruction being brought against them. The corporation reserved the right to control car speeds, departure and arrival times, and the type of carriage to be used. The corporation could buy out the enterprise after eleven years at a price based on its actual value plus 30% for goodwill and compulsory purchase. The maximum fare was placed at one

¹ H D Davies The Way Out 1861 p 43

² Liverpool Tramways Act 38-9 Vic xlvi

penny per mile. The local authority had no intention of losing control of its streets, and had in fact cut out its road maintenance commitments considerably into the bargain.

The first three miles of the Liverpool system were opened in November 1869 and were hailed as a great success.

In the same year the reformed Parliament passed the Metropolitan Tramways Bill and another American venture, the Metropolitan Street Tramways Bill.¹ These bills, centring attention on London, involved much Parliamentary discussion. It was argued that a great constitutional question was at stake; could the House grant to a private company the right to monopolise large sections of the public highway?² The bills went to Select Committee under the chairmanship of Sclater-Booth whose own opinions on the matter made it certain that the promoters would have a rough time.³ The result of the Committee's

¹ One of the promoters of the latter was William Evans, agent for the Erie Railroad Co which was involved in questionable financial practices at this time.

² Hansard /3/1869 3rd serv. Vol 194 col 543

³ He argued that it "should be borne in mind that those who advocated the tramways were the people who now travel in omnibuses, whereas a large number - he supposed the majority - travelled in cabs and private carriages."

Hansard 1.3.1870 Vol 199 col 1086.

deliberations was "such a bargain on behalf of the public as has secured to the latter such terms as they perhaps would never have dreamt of making for themselves."¹

The Committee considered that monopoly of the track did not constitute monopoly of the roadway as long as the companies had simply sole right of using flanged wheels and other vehicles had to clear out of the way of an approaching tramcar. But any tramway undertaking was to be carefully controlled. After three years operation, if the Board of Trade were convinced that the public were not getting the full benefit of the system - a usefully vague term of reference - it could issue licences to other parties allowing them the use of flanged wheels, or it could order the tracks to be lifted. The vestries could buy over the lines in their related areas after twenty-one years by a procedure preceded in the 1844 Railways Act. The maximum fare was set at one penny per mile with an allowed minimum fare of threepence for trips of less than three miles, and workmen's half fares were stipulated for the mornings and evenings. These were onerous conditions for an untried investment, and even in failure the the venture would be expensive as the 'Times' gleefully pointed out; "At all events, if it does prove a failure, it only requires the signature of twenty ratepayers to get it done away with if it is

¹ Times 26.5.1869.

proved to have failed, and done away with too, at the cost of the company".¹ With all these constraints the bills were passed in 1869.

The safeguards which the Committee had thought fit to include in the acts show how wary Parliament was of the potential for speculation on the streets of London. Even Bright should have seen some warning signs when he described the promoters of the Metropolitan Street Tramways Bill as "very willing to concede everything it was possible to concede in carrying out this great improvement for the metropolis."² Others were more cynical and saw them as a group of self-styled philanthropists in for a quick dime.³ Indeed, the willingness of the promoters to accept the long-term threat of purchase, and the short-term threat of Board of Trade supervision, and even price fixing, make it clear that tramway operation was furthest from their minds. These men wanted to promote tramways, to build tramways, and then to sell tramways.

This was the goal of the final Tramways Act passed in 1869.

¹ loc cit

² Hansard 13.5.1869 Vol 196 col 739

³ Hansard col 549 Vol 194. 3.3.1869.

The Pimlico, Peckham and Greenwich Street Tramways Company¹ heralded the arrival of the domestic railway promoter led by contractor William Morris and the industry's arch speculator-to-be, his brother, John Morris. These three acts authorised the construction of twenty seven miles of track in London, to run from Whitechapel to Bow Road, Westminster Road to Kennington, Brixton and Clapham, and from Pimlico to Greenwich via Vauxhall. The latter two companies, the Met. and PPG. amalgamated at the end of 1870 to form the London Tramways Company.

Tramway mania began to spread. Six bills came before Parliament in 1869 seeking to build fifty miles of track with a capital of £811,000. In 1870 twenty-seven companies came forward for powers to build 515 miles with a capital authorisation of £4 million.² Something had to be done to cut down the time spent on the technical and purely local considerations such private legislation was demanding in Parliament. A mini-1866 was imminent, but Parliament had learned several important lessons from that financial debacle.

¹ For details on the routes these tramways used, see

C Klapper The Golden Age of Tramways 1961 pp 31-32

² Hansard 1.3.1870 Vol 199 col 1080.

Chapter Two.

The Horse Tramcar in Britain 1870-1890.

The General Tramways Act of 1870¹ was one of convenience in that it aimed at drawing up conditions under which tramways could be built. The pressure of Parliamentary business at this time was pushing much routine work into government departments, and the act itself was designed for this end, to contribute to the growth of what Thomson has termed 'delegated legislation.'² When the Board of Trade introduced the bill in March of that year, its President, John Bright, was ill, and the actual piloting was carried out by the Board's Secretary, Shaw-Lefevre.³ The bill was presented because "the principle of tramways must be admitted,; and that the only questions were by whom they were to be made, what control local authorities were to have power of them, subject to what terms as to fares and dividends and of repurchase by local authorities, and to

¹ General Tramways Act 33 and 34 Vict. Ch. 78. The construction of the Act, and its aims, are similar to the original Railways Bill introduced by Gladstone in the 1840's. His bill sought Parliamentary right of purchase of new railway companies after fifteen years, and the power to revise their fares. His 1844 Act lost much in the passing, but now, as Prime Minister, the 1870 Act embodied the ideals unattainable to him twenty-five years earlier.

² D Thomson England in the Nineteenth Century 1950 p 178.

³ Most of the following is based on the Parliamentary debates in Hansard 1.3.1870 Vol 199 cols. 1080-1086.

what streets and roads they were suitable."¹ Shaw-Lefevre had previously received a deputation from several municipalities,² and in consequence, he anticipated the main opposition to the bill to come from that quarter "to the effect that they did not wish to part with the control over their streets;" if tramways were to be built at all, the local authorities would rather build themselves and then lease the tracks to private undertakings.

At the very least the Board of Trade were in favour of municipal supervision of tramways. The proposed purchase clause dismissed the goodwill and future profits aspects of valuation so that authorities could indeed purchase undertakings without the legal wranglings of valuation disputes. So that private enterprise might not be scared away, the bill suggested that there be no ceiling on dividends, and no compulsory lowering of fares.

In line with the procedure set down by the Railway Construction Facilities Act, the Board recommended that

¹ loc cit col 1081

² The deputation comprised delegations from Manchester, Leeds, Glasgow, Birmingham, Salford and Stockport.

instead of individual tramway acts, it should issue certificates of construction which would become law after sitting in the House unopposed for six weeks. The Board might have won this power had not Shaw-Lefevre's personal zeal for municipal control led him to suggest that these certificates be transferable subject to Board approval. This provided the basis of his strategy on how the tramway network would be developed. He considered that the best body to control building was the local authority in question: it should propose route plans, gain Parliamentary sanction, and then farm out the concessions to tramway contractors and operators. In this way, the towns would end up with planned and integrated tramway systems rather than networks of competing and unrelated tramway routes.¹

Parliament did not share his vision of the altruistic councillor, and realised that the hand of the ordinary citizen had to be strengthened. Few denied the fact that tramway companies could not be allowed to disrupt the streets, and charge high monopoly prices, as the gas and water companies were doing, but on the other hand, it was argued that 'there ought to be more provision for the

¹ Shaw-Lefevre considered that "a tramway was in the nature of a monopoly, which ought to rest only in the local authority" Journal of the Royal Statistical Society Vol 63 1900 p 408.

approval of persons interested than that of the local authority, the more so as the local authority of many towns might be governed by persons having a personal interest in their construction.'¹ The act was designed to safeguard the rights of those who did not want tramways as well as ease the lot of those who did. Local authorities were given the right of veto to any scheme, but Parliament also decided that Property had to have a say to counter the potential for local authority fascism, and in turn the frontager's veto was introduced. If a proposed line ran for more than ten yards at a distance of less than nine foot six inches from the kerb, then, if a third of its frontagers objected, that part of the line could not be built. Here was a powerful weapon to defend the values of narrow central street property.

The early tramway promotions had introduced into the minds of many MPs doubts as to the integrity of their backers. The Board's proposal for certificates was replaced by the Provisional Order system whereby the Board scrutinised all schemes and allowed only the valid ones to go on into the House where normal composite bill procedure would be adopted. Parliament had decided to hold the final say on all matters concerning tramways. The right of Private Act was left open for the promoter:

¹ Hansard 30.5.1870 Vol 201 col 1592.

the Provisional Order system was designed to cheapen and speed through the enactment of bills where no opposition was to be anticipated.

To prevent speculation, the selling of concessions was forbidden. This was invoked under Standing Order 157 which had been introduced in an attempt to prevent clandestine empire building in the railway world. The order was strengthened with a rider which stated that all lines named in a Confirming Act (confirming the legality of a Provisional Order) had to be constructed within two years of the passing of the Act. Promoters could not sell out until the lines had been in actual operation for six months.

The Board was given a powerful supervisory role in the fight against monopoly abuse. After three years of working the Board could licence the use of a line to other parties if it were proved that the public were not getting its full benefit. The Board was left to specify the tolls and charges which could be exacted by the promoters and it set the precedent at a penny per mile maximum fare with an optional minimum fare of threepence for less than three miles. Citizens were given the guarantee of cheap fares and local authorities got the road maintenance commitment to compensate for some loss of jurisdiction.¹

¹ Companies had to maintain the roadway to a distance 18" on either side of the track, and maintain the roadway between the double track if the intervening space was less than four feet in width.

The Act accepted that monopoly was the only framework for efficient tramway operation short of covering the streets with iron rails, and that the effective counter was strong and continuous regulation.

The final main regulation set down in the Act reduced the relative influence of the above rules to insignificance. The Purchase Clause allowed local authorities to buy over tramways in their area at the "then value" after twenty-one years of gaining Parliamentary approval.¹ Many operators in the 1890's, and most tramway commentators since, blamed this clause with bringing the industry to stagnation at the end of the century, but as we shall discuss later (see pp. 72 - 75) this accusation turns out to be more of a public relations exercise than a sound business grievance. The concept of councils buying over their tramways after twenty-one years was not developed for the furtherance of municipal operation, but rather that local authorities might lease them out at a profit if the financial returns of the undertaking had proved to be

¹ As will be seen below, the act referred specifically to the tramline, and not the tramway undertaking as a whole, thus a system of lines built under a number of acts was subject to a series of takeover possibilities as the twenty-one year period came into effect on the lines of different ages.

attractive. The rates could not be put at risk,¹ but if the profitability of an undertaking could defray the rates then municipalisation would be tolerated and even welcomed. The valuation regulations were drawn up to prevent the recurrence of the current problem facing authorities who were trying to buy over gas and water monopolies only to find these undertakings responding by demanding exorbitant upset prices.

In all, the Act was a nicely calculated response to potential misuse of economic power and disregard for urban amenity which other public utilities had shown tramways could easily assume. The complexity of the act - its safeguards against speculation, consumer exploitation, and local authority domineering, and its protection of property rights - corroborate Briggs' statement that in Victorian towns "economic individualism and common civic purpose were difficult to reconcile."²

¹ Since the majority of local finance came from the rates, "a predominantly lower middle class section" of the community - investors in house property - were pushed into local politics with the aim of keeping the rates down. E P Henneck *Finance and Politics in Urban Local Government 1835-1900* Historical Journal Vol 6 1963 p 227

² A Briggs Victorian Cities 1963 p 18

The passing of the Act threw up the first wave of tramway promotions which worked itself out by 1877 and left in its wake forty companies operating on 213 miles of track and providing transit facilities in all the major towns of the country (see Statistical Appendix 1). Only seven local authorities followed the Shaw-Lefevre plan and leased their thirty-four track miles to private operators.¹

Notwithstanding the passing of the Act, however, the introduction of tramways into the towns was no easy matter; much local suspicion and hostility had to be overcome.

If Parliament had been concerned about the risks of American speculation in British towns, the towns themselves were concerned about the risks of London-based speculation in local thoroughfares. Although local authorities did little positive in the way of tramway promotions, they did wield their right of veto to ensure local representation in any relevant undertaking so that considerations of urban amenity and local demand might be met fairly.

In fact, the railway agents and contractors had the business sewn up tightly from the outset. Tramway promotions attracted local investors who turned out to be easy prey for these experienced businessmen who were finding tramway floatations to be a remunerative activity when railway business was dull (see Figure 2.1). With 104

¹ The Corporations and Police Boards of Birmingham, Bristol, Glasgow, Greenock, Manchester, Salford and Sheffield.

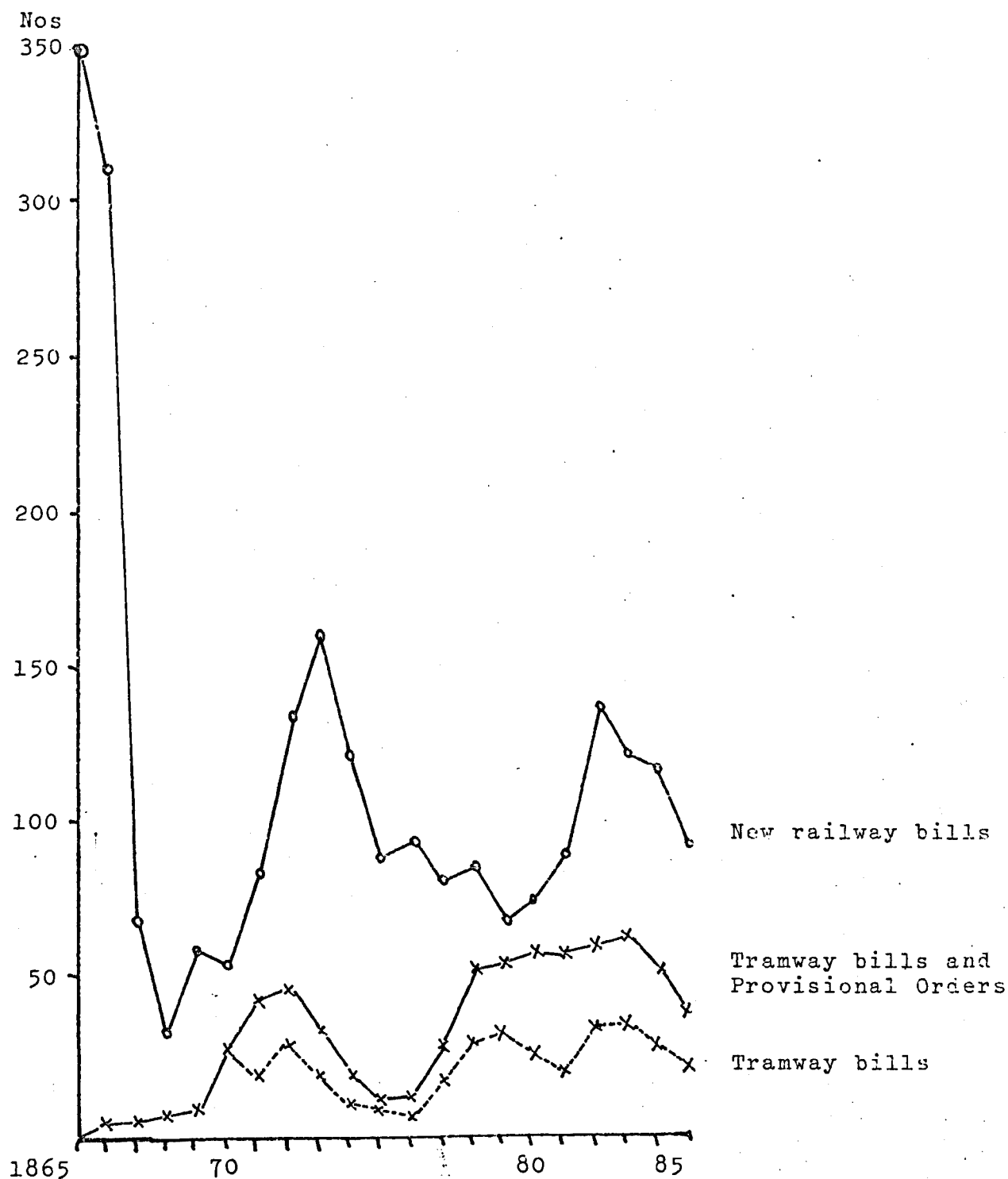


Fig. 2.1 Numbers of railway and tramway bills presented to Parliament 1865-1885

Source: Annual Board of Trade Returns on Railway, Canal, Tramway, Gas and Water Bills.

considered a fair estimate of anticipated dividend, the railway press itself could only admit that it was "not surprising that a large number of investors who have not been fortunate in their selection of railways, and who have consequently not realised the expectations they had entertained, should be considering, leisurely and maturely, the propriety or otherwise of embarking on a series of purchases of tramway shares."¹

Many, if not the majority, of these tramway companies were promoted by syndicates of Parliamentary agents and engineers, and there was a strong influence of irregular American railroad financing built into them. The three major promotional companies were floated in 1871 and 1872, and a brief look at their aims and directors will show how the railway interest had gained control.

The British and Foreign Tramways Company was floated in July 1871 "to carry out tramway enterprise in connection with the parties who have been mainly instrumental in the introduction of tramways into this country ...".² Its directors included Philip Rose director of several British and foreign tramway companies and a partner in the

¹ Railway Times 13.6.1871 Vol 34 p 536

² British and Foreign Tramway Company Prospectus. Issued July 1st 1871.

Parliamentary solicitors of Baxter, Rose and Norton, agents for such railway companies as the Great Eastern and the Brighton and South Coast: William Morris, railway contractor; William Sheldon, Brussels contractor; and the new company's agents were the corporation lawyers Ashurst, Morris and Company of whom John Morris was "a well-known City man, who had a great deal to do with the reconstruction of American railroad undertakings in the 1860's,"¹ and who was the legal representative of the Erie Railroad Company.

The General Tramways Company was floated at the same time, and its prospectus neatly overcame the regulations of the 1870 Act. "The present Company is formed for the purchase and acquisition of privileges and concessions for tramways in populous towns in the United Kingdom and on the Continent, for undertaking the construction, working, and maintenance of such tramways, and for disposing of the same from time to time as may be found advantageous."² Its promoters included W Busby chairman of Liverpool Tramways; R A Read, general manager of the Somerset and Dorset Railway; T Short, British agent for the Buffalo and Lake Huron Railway Company, and Lord Robert Montagu, a major shareholder in the Atlantic and Great Western Railroad.

¹ H O O'Hagan Leaves from my Life 1929 Vol 1 p 397

² General Tramways Company Prospectus July 1871.

The Provincial Tramways Company was formed in 1872 "for the purpose of acquiring and working tramways in several large provincial towns, generally through the organisation of Local Companies, but under one central management or control, whereby greater efficiency and economy will be obtained."¹ This final syndicate had hit upon the solution to the problems of Parliamentary control and local suspicion. Organisations of local companies would allay fears of 'foreign' enterprise, and when one considers the essentially local character of public transport operation, the argument that greater efficiency could be gained through central management channels must refer, not to the revenue account of company operations, but to the capital account, specifically to Parliamentary fees, preliminary engineering, and line construction. In other words, this company was designed to guarantee for its promoters a flow of future business, but not in the tramway working, rather tramway promotion and construction. Again, the Provincial Company directors included William Morris and the legal companies of Ashurst Morris and Company, and Baxter, Norton and Rose. The Provincial and BFT had interlocking directorships and parliamentary agents, and shared a secretary, one J B Glenn.²

¹ Provincial Tramways Company Prospectus June 1872.

² These names will become familiar in the case studies below on Edinburgh and Glasgow. They have been listed here to show that their interest were not confined to the above mentioned towns.

The country's major promoter was John Morris, who, along with George Hopkins, had represented the tramway interest before the 1870 Select Committee on the Tramways Bill. Morris was involved in the promotion of tramways in Edinburgh, Glasgow, Liverpool, Dublin, Cardiff, London, Belfast, Plymouth and Portsmouth, and he had unsuccessful attempts in Dundee, Southampton and Tynemouth. His modus operandi was to form a syndicate either from BFT, or Provincial, or outside, and then visit towns to get the interest of local notables. In 1870 he was in Glasgow, Edinburgh and Dundee. In Edinburgh he convinced Dr. Alexander Wood to become a director and so used the respected name of the gentleman as a guarantee to the local authority and investors of the stability and genuine purpose of the venture. In Glasgow he bought out Andrew Menzies, again a highly respected omnibus proprietor who had shown himself to be a responsible undertaker of public transport services in the city. Once local authority consent was forthcoming, the schemes went before Parliament, prepared and presented by the syndicate, and if successful, the final concessions were returned to the local promoters. After the construction phase was over, the London promoters would pull out, taking their Parliamentary fees with them. Morris retired from the board of the Edinburgh Street Tramways Company in 1872 when the legal and Parliamentary expenses for the thirteen miles of track amounted to over £30,000; and in the more complex case of the Glasgow Tramway and Omnibus Company, the

syndicate was rewarded with a clear profit of at least £150,000. Such practices were a "great feature of tramway promotions" in that "the original promoters generally cleared out as quickly as they could looking for their profit to an inflated capital, rather than to the steady investment yield."¹ O'Hagan himself a prominent tramway speculator admitted that "if the Act of Parliament or Provisional Order was obtained, it was usual for the syndicate to sell it to a contractor or financier at a considerable profit over the cost of obtaining it."²

It was a few years before the extent of such private-gain oriented promotion became apparent. The London Tramway companies of the 1880's were discovered to be controlled by "family parties and private rings" and concerns were found to be running in too many cases for "the interests of the promoters and immediate adherents than in those of the actual bona-fide proprietors. There is no class of security that lends itself more readily to clever manipulators, and there is no class of beings so given to believe all they hear as the small investor."³

Given such a promotional complex, it is not surprising

¹ E F Vesey-Knox The Economic Effect of the Tramways Act of 1870 Economic Journal Vol 11 1901 p 504

² O'Hagan op cit p . 54.

³ Railway Times 21.5.1887 Vol 51 p 657.



to find that the tramway routes themselves were not speculative. They followed existing omnibus routes for the most part, and so ran mainly from the suburbs to the central business districts. These new tramway termini had the effect of liberating their outlying half-mile or so of land around them to profitable development, and once this had been exploited, the line would be extended and the liberating process started afresh. In this way the tramway was not in itself speculative yet it did have an enormous impact on urban growth. (For a full discussion see Chapter 7) Such system growth brought with it serious problems. As networks extended, their demands became increasingly commuter-orientated with the result that morning and evening peak commitments required capacity to stand idle in the interim. It was for this reason that a bid to sanction steam tramways was made in the late 1870's following the building boom of the mid-decade.

At first steam trams were set up as being cheaper than horses, but this was soon proved false on the Vale of Clyde Tramways and elsewhere.¹ Steam working expenses of 4d or 5d per mile run, as opposed to the 6d and 7d for horse power, were increased by the greater wear and tear

¹ Select Committee on Tramways (Use of Mechanical Power)

PP 1877 Vol 16 Q's 1448 and 600.

on the rail incurred by the heavier steam tramcar, the costs of keeping a sophisticated engineering capability, and the need to pay higher wages for the skilled steam tramcar drivers.¹ The real economy in the use of steam power lay in its ability to provide a cheaper reserve capacity. "You cannot keep horses in reserve except at great expense," said the chairman of the North Metropolitan Tramways Company in 1878 "and if you keep a number of horses which you do not use, they would be, to use a common expression, eating their heads off."² The capital charges for horse and steam traction were very much the same; a stud of horses and harnesses for one car cost \$550, and with a maximum useful life of five years, this gives an annual capital charge of just over £100. A steam car could cost £700, thus a life of seven years could make it a cheaper all-round proposition.³ The working expenses of the two systems were roughly equal but "horses must be fed whether they are working or not"⁴ and so steam appeared to be cheaper for peak hour services.

¹ Robinson Souttar Street Tramways Minutes and Proceedings of the Institute of Civil Engineers Vol 50 Pt 4 1876/77 p 18.

² Select Committee on Tramways (Use of Mechanical Power) Bills PP 1878 Vol 18 Q 635

³ Select Committee on Tramways 1877 op cit Q 1459

⁴ ibid Q 1851.

Steam tramways finally got official approval in 1879 when Parliament accepted a House of Lords' Committee recommendation that the Board of Trade be allowed to issue seven year licences for steam tramway operation subject to the strict conditions over steam and smoke emission, noise, brakes and speed being fulfilled. This committee was the third to deliberate on tramway policy over the years 1877 to 1879, and naturally enough the industry languished somewhat in anticipation of a decision. In the event, the final committee came out strongly in favour of local authority construction and maintenance, though not operation, so that the integrity of the public highway might be assured, but in general the structure of the industry was not altered.

Nevertheless, public outcry curbed the use of steam tramcars. To opponents of tramways here was their nightmare come true: they were threatened with belching trains startling horses and mowing down pedestrians indiscriminantly. In some situations, however, the steam trams did win through. In towns like Gateshead, Bradford and Huddersfield, steam tramways were built because gradients had made horse tramways impossible, and although the social costs of noise, smoke and danger of explosion were the same as elsewhere, the resultant social returns were much greater.

The mileage of steam tramways rose from six in 1878 to

fifty one in 1883 and then expanded to two hundred and fifty five by 1891 (see Statistical Appendix Section 1). This growth in steam enterprise also suffered from a great deal of speculation, especially by the infamous city man Henry O'Hagan. He promoted steam tramways in Birmingham, South Staffordshire, South East London, North Staffordshire, North London, Gateshead, Stockton, Darlington, St Helen, Worcester and around Manchester - in all, companies "whose shares would not sell on open market for 50% of their nominal value"¹ because of gross stock watering. A parallel development to the 'notorious'² tramway ring of Cheapside in the 1870's was the Contract Construction Company of 1888 but now the technical press could see through such fraudulent floatations. The account by the Railway Times could quite easily have been referring to the companies of 1871 and 1872 described above. "The tramway companies of which Messrs. Cramp and Green are directors, Mr. Holt engineer, and Mr. Chubb solicitor, give out their contracts to the Contract Construction Co. Ltd. in which Messrs Cramp, Green and Holt, and a lady named Chubb, are the principal shareholders, the capital being so arranged that nearly the whole of the profits must necessarily go to the shareholders of the founders' shares."³

¹ Railway Times 20.10.1883 Vol 46 p 1039

² ibid 27.10.1888 Vol 54 p 1107

³ loc cit.

Such dealings ensured for steam tramways a rapid, but brief, expansion. Contrary to expectations the two traction systems rarely worked together as in Birmingham, but they were used as separate ways of tackling the topography of towns or service areas. Horse tramways ceased growth around 1884,¹ and steam tramways stopped around the early 1890's. In the 1890's the industry as a whole stagnated, and the blame was placed firmly on the influence of the Purchase Clause. It was argued that impending municipalisation discouraged private investment, which by this time meant, in fact, retarding the conversion of track to electric traction. Before discussing this issue, a look at the financial position of tramway companies in the 1890's should put the problem into perspective.

The horse tramway industry had a very high expenses to revenue ratio of around 75%, with over half of this expenditure (57%) accounted for by traffic and horsing costs, i.e. fodder, wages and horse renewals (see Statistical Appendix Section 1). Opposed to this, capital investment had a high potential revenue earning power; in 1885, for example, average gross earnings gave a return of 22% on capital employed in contrast to the 8.5% experienced on the railways. In practice the effective life of the permanent way turned out to be in the region of fifteen years, and so its own capital charge of no less than 6% left a clear revenue earning potential

¹ W W Duncan Tramway Manual 1884 p 3.

of say 16%. The working expenses diminished this encouraging estimate to an actual net return of 4% with the equivalent railway return of 4.02%.¹ The average tramway dividend in 1885 was 5%* which shows that for the industry as a whole, true capital costs were either ignored or underestimated. In that year receipts per mile run were 12d. and working expenses amount to 9d, and out of the net receipts a 5% dividend was equivalent to 2.7d per mile run, leaving a surplus of Q.3d for capital charges, or £80 per annum per mile of track. Although the construction costs of permanent way varied enormously, an estimate of £10,000 per double mile of track is fair, and such an estimate produces a requirement for a renewal fund of the order of £800 per annum (discounted at 3% over fifteen years), or ten times that actually budgeted. To be fair, early tramway engineers did not foresee the large increases in usage their lines would have to accommodate, and since they saw their rails lasting for over twenty-five years² estimates of ideal reserve allowances were put at around £350 per annum³, - though even this was a

¹ Board of Trade Return on Railways PP 1886 Cmnd 4819

² Souttar op cit p 10

³ The estimate was made by engineer G Hopkins in D K

Clark Tramways: Their Construction and Working 1878. p 273.

* See figure 2.2.

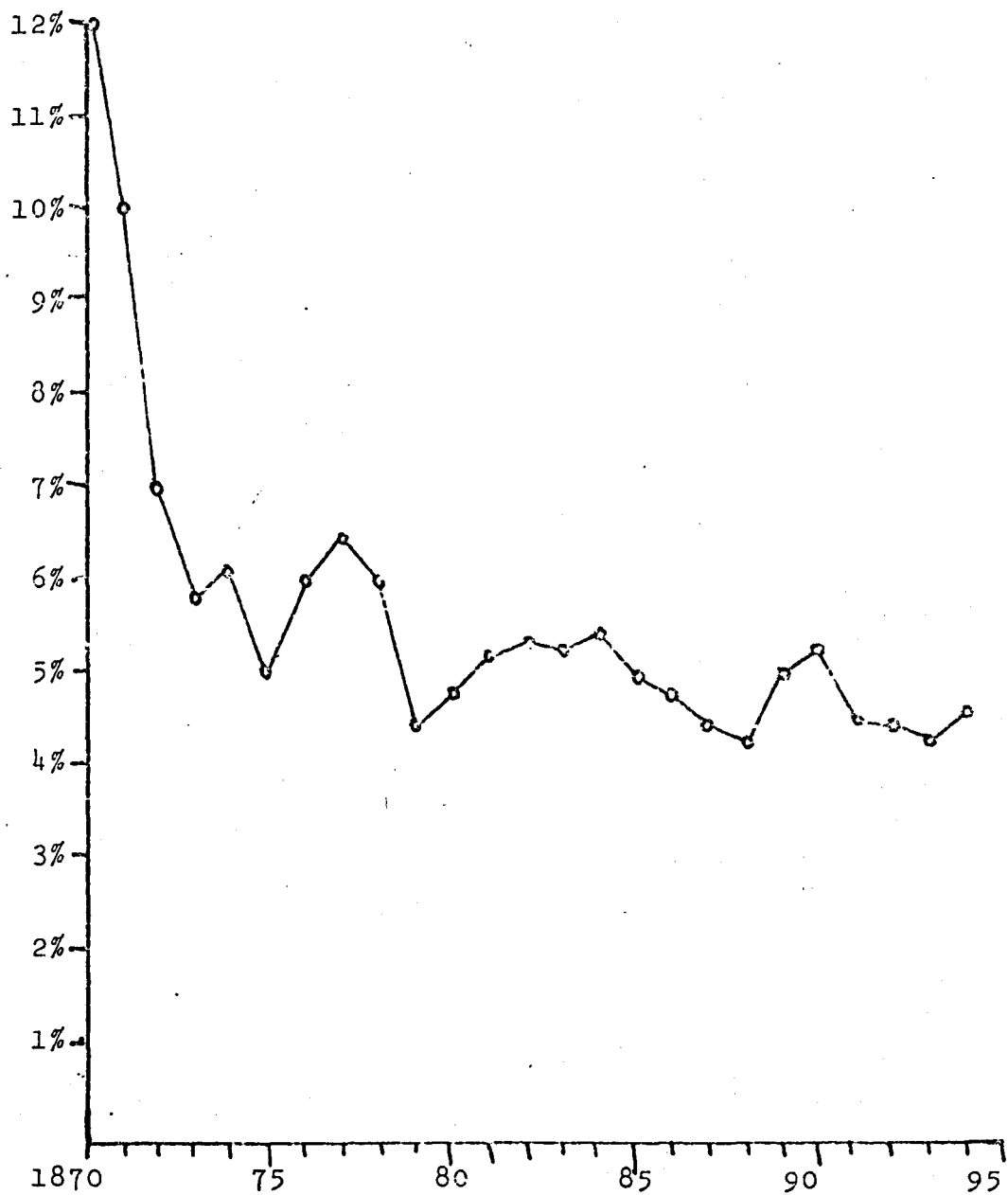


Figure 2.2 Average company dividends on ordinary shares.
Approximately 75% of tramway capital was in
ordinary shares.

Sources: Duncan's Tramway Mannual; Tramway Intelligence.

Over and above this, the maximum fares clauses which had been so easily accepted in the optimistic early days now prevented fare increases from raising revenue. Even where legal fare maxima had not been reached, local pressures ensured that any such policy mooted by a company would be countered with hostility from both local authorities and residents' associations of all descriptions. Both fares and line-extension policies were arrived at by company boards through the portals of local and political pressure. Such was the case in the early 1880's when extensions produced a fall in revenue per mile run from 15d in 1878 to 11d ten years later (see Figure 2.3). Residents demanded tramway communication to their new suburbs, councils demanded overall town coverage, and local opinion demanded efficient service, cheap fares, and a sense of civic purpose. Tramway companies had to survive amongst these forces, and normally had to succumb to them or be branded money-grabbing speculations. Councils could threaten the recalcitrant company with announcements of their intention not to offer the lease to it should the council decide to buy it over under the Purchase Clause option, and such a threat gained in political practicality the more a company appeared to be playing its own game without showing concern for the town's interests. Indeed, as the 1890's progressed such a threat would be welcomed by many company directors as a way out of their ailing business, allowing them to leave as political martyrs than as

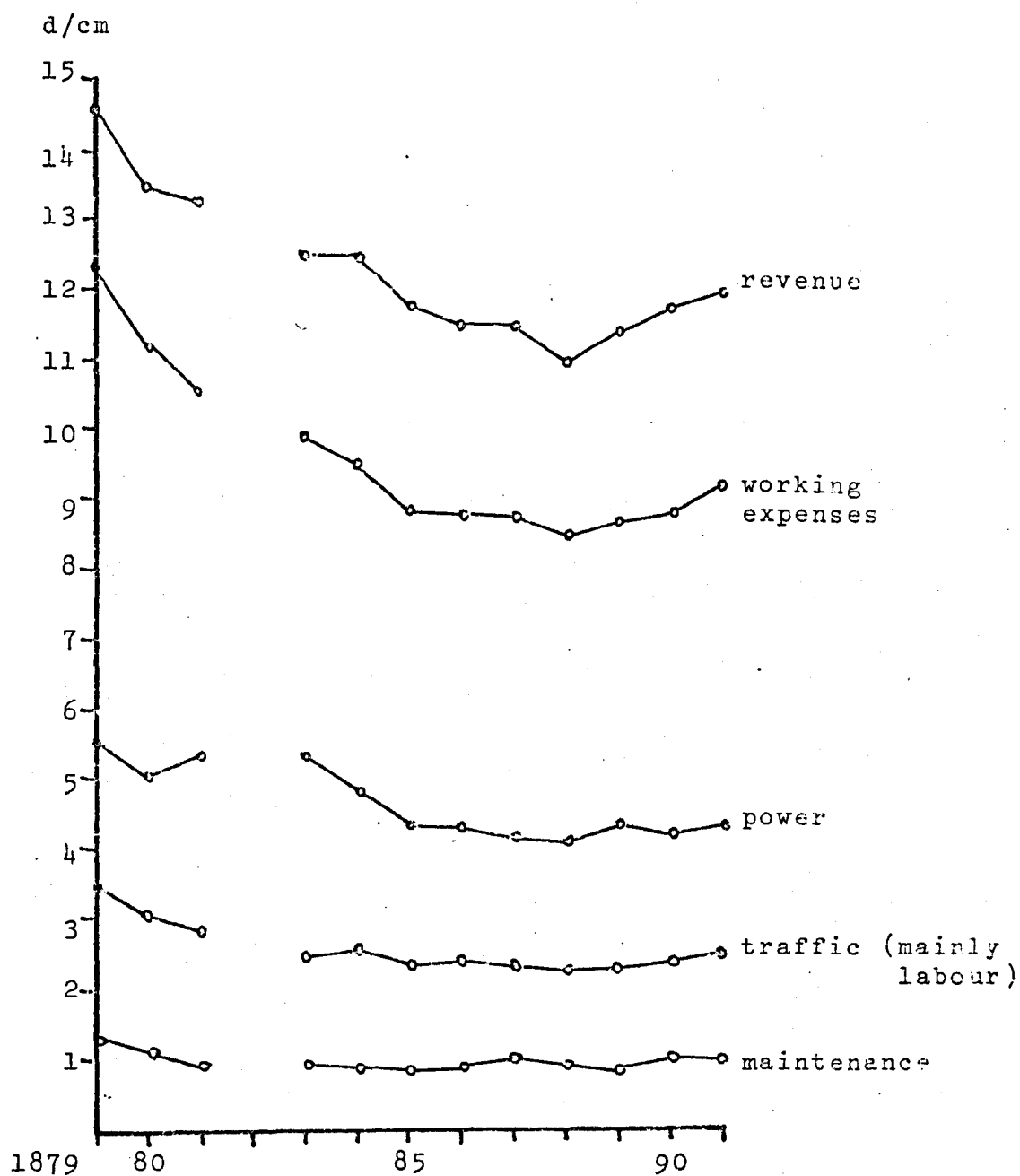


Figure 2.3 Average company costs and revenues 1879-1891

Source: See Statistical Appendix Section One

commercial failures. By 1893 "with some companies it is as much as they can do to keep straight; they are neither prepared nor able to borrow money, and with the onerous conditions of the Tramways Act 1870 staring them in the face, there is scarcely a board of directors in the country who would care to meet their shareholders with proposals for new capital expenditure to any extent, having enough to manage with the lines now under their control".¹

The industry was stagnating because, in terms of a free market economy, fares were too low. Throughout the period the average fare per passenger was less than three-halfpence, and it was certainly much less than the value of time saved by the suburban commuter. A tram journey from three miles out would cost threepence and last around thirty minutes which constituted a saving of fifteen minutes over walking time. This values the traveller's time at one shilling per hour, or say, £125 per annum, which was much less than that earned by the suburban villa dweller, although, in passing, it is twice that of the labourer's wage (vide the dockers' tanner).

Within the funnel of decaying capital and fixed fares, dividends remained fairly stable because companies were

¹ Electrical Review 15.9.1893.

following the short-term objective of shareholder satisfaction. Higher, more realistic fares could have allowed the industry to break out of its decline, but by the 1880's tramway companies were in the ambiguous position of serving God in the council chamber and Mammon in the boardroom. The industry had the financial structure of private enterprise and the pricing structure of a social service. But the social benefits of the service in allowing dwellings to be built in the healthier suburbs at lower rentals were not being paid for by the community through fares or subsidies, and shareholders certainly were not going to pay for them with lower dividends. The tramway company had only one option; satisfy everybody and milk the investment dry.

The tramway industry had one hope of assured future prosperity and that lay in the utilisation of any invention which could reduce their high working expenses and so allow the potential high returns of capital investment to be realised. To appease shareholders, the cheaper such an innovation could be, the quicker it could be implemented.

Chapter Three.

Electrification and Municipalisation 1890-1914.

The first urban electric tramway in Britain was opened in Blackpool in 1885, but the idea of using electricity as a tractive force was not new. In 1839 Robert Davidson ran an electric railway car between Edinburgh and Glasgow at a speed of 4mph.¹ Further work in primary cells such as this showed, however, that electricity was not an economic source of energy, but that it was ideally suited for the transmission of power. For this reason electric traction research languished until the late 1870's when tramway companies realised that horse power was too expensive in financial terms, and city authorities had decided that steam power was too expensive in social terms. The solution was to compromise; if the steam engine could be situated in one place, and its power directed to the cars, then both economy and amenity would benefit. The issue was resolving itself into two questions; how could the power be transmitted, and how could the power be collected by the cars.

The cable tramcar was the pre-electric technological answer. The steam power was transmitted along the route

¹ H C Passer The Electrical Manufacturers 1875-1900 1953
p 211

H Scholey in Electric Tramways and Railways 1896 puts it at 1837.

by means of a continuous cable running underneath the track in a sunken conduit, and the cars made contact by means of grippers inserted into the conduit. Tightening the gripper attached the car to the ever-moving cable, and to stop, the gripper was simply disengaged.¹ The first section of the San Francisco system was opened in 1873 and cost around £14,000 per double-mile to build. Chicago started cable operations ten years later, and by 1895 the American cable tramways reached their maximum mileage of 662 - only 8% of the US total.² The first British cable tramway was opened on Highgate Hill, London, in 1884, and cost £18,000 to build and equip the route mile.³ Similar lines were laid in Birmingham in 1888 and Edinburgh in 1888 and 1890.

The high capital cost of cable tramways narrowed their use to routes of very high demand or steep gradient. The one central power source meant that the marginal cost of increased frequency of service was virtually zero, and that after some critical demand load cable tramways became increasingly cheaper to operate than horse tramways where the marginal cost of service increase was nearer the

¹ Cable tramways are considered in more detail in Chapter 5.

² J A Baker Report for LCC on Tramway Traction October 1898

³ Much of the information on cable tramways is taken from a series of articles by J Bucknell-Smith in Engineering 1885/1886.

average cost. In the 1880's such heavy demands, as experienced in Chicago, rarely existed in Britain, but steep hills did. Cable traction was a technical improvement on steam's ability to surmount gradients; the cars were hauled up, and since the cars needed no motors they were much lighter.¹ The San Francisco tramways overcame gradients of 1 in 6, and the Edinburgh tramways brought the North side of the city back into contact with the centre.

Even although working expenses might be halved, the cable system required high demands, straight streets as sharp corners demanded complicated pulley systems and it introduced a third line of metalwork into the roadway. Bearing in mind the financial position of tramway companies in the 1890's, cable tramways were not seen as a sound investment by many, apart from, significantly enough, William Morris, who sang their praises to the Institute of Civil Engineers in 1883.² Under British demand conditions cable tramways were used to overcome the steepest gradients, with their heavy capital expense making them useful adjuncts to the existing networks, not replacements.³ This high expense and requirement

¹ This reason prompted Newcastle Corporation to recommend cable traction as late as 1894. Report to the Tramways Committee 13.6.1894.

² Minutes of Proceedings of the Institution of Civil Engineers Vol 72 1882/83 Pt 2 p 210.

³ By 1902 there were only 25 miles of cable tramway in Britain, 17 of them in Edinburgh.

for relatively straight streets was the outcome of placing too much of the power generation and transference complex in one place; by 1880 engineers had realised that the motor "was to be the key component in the electric transmission of power. It could replace other methods of transmitting power (cables, belts, shafts) but would not be a substitute for prime movers."¹

By the late 1880's the basic electric motor had been perfected, and only the problem of transmission remained. The earliest electric traction trials such as those of Siemens and Halske at the Berlin Exhibition in 1879, and on their Lichterfelde line in 1881, the Portrush and Giant's Causeway Line opened in 1883, Volk's Brighton beach line of the same year, and the Traill brothers Bessbrook and Newry line of 1885, these lines were by necessity rural since power was transmitted along a third, live, surface rail.²

The obvious way of making the system compatible with the urban environment was to sink this third rail beneath the road surface into a conduit similar to the cable technology, but instead of a gripper there was a copper

¹ H C Passer op cit p 213. Own parenthesis. Part 3 gives an excellent history of electric traction developments in America.

² For a complete list of electric tramlines see "Electric Review Vol 33 18.8.1893 p 172.

contact sliding along the rail. Such systems were opened in Cleveland, Ohio in 1883, in Blackpool in 1885, Boston, Massachusetts in 1888 and Budapest in 1890. Again, the cost of constructing such lines was enormous at £6,000 per single mile¹ in contrast to £3,000 for a horse track mile.

If the transmission line was too expensive or dangerous when placed under or on the street, then the only remaining place was above the street. Overhead wires presented a major problem in power transference from the line to the car which was not beaten until Frank Sprague designed the under-running pick-up for the Union Passenger Street Railway Company of Richmond, Virginia, in 1887/88.² One line was suspended above the track, and the return circuit was made via the rails. The system was cheap to build at £4,000 per single mile for track and overhead equipment,³ and by 1890 motors had been improved⁴ which resulted in

¹ Select Committee on Electric Powers (Protective Clauses)
PP 1893/4 Vol XI Q 2367

² F J Sprague The Genesis of the Multiple Unit System of Electric Train Control in Transactions of the Newcomen Society Vol 13/14 1932/3 p 117. Previous to this power was transmitted to and from the car by overhead wires and a small trolley ran on and between the wires to collect and return the current, hence the term 'trolley car'.

³ J.S.C. on Electric Powers op cit Q 2367

⁴ A Rechenzaum Load Diagrams of Electric Tramways and the Cost of Electric Traction Journal of the Institution of Electrical Engineers Vol XXXI 1892 pp 293-309

working expenses of 5.5d/cm.¹ Sprague's breakthrough sparked off a huge investment in electric tramways in America where electric tramway mileage rose from 2,500 in 1890 to 10,752 in 1895. By 1896 Germany had around 250 miles, France 90 miles, and Britain had only 36.² Why was Britain so slow in taking up the overhead trolley system?

The financial precariousness of most of Britain's tramway companies precluded any major innovation investments as were undertaken in America. The fascination that companies showed in accumulator cars was bred of their inability to raise cash. The accumulator car required no investment in track or transmission gear, and experiments might even be funded out of horse replacement revenue; accumulator cars held out the hope of a gradual move away from horse traction. At the beginning of 1890 the North Metropolitan Tramways Co. was running six accumulator cars along the Barking Road at a rent of 4.5d per mile to the Electric Traction Co.³ In July three miles of line were opened in

¹ Report on Various Systems of Tramway Haulage prepared for Leeds Town Council by City Engineer T Hewson. January 1895 p 32.

² Report of Tramways Manager on Electric Tramways to Glasgow Corporation January 1895

³ Electrical Review Vol 26 17.1.1890 pp 72/73.

Birmingham for accumulator cars. However, maintenance costs were to prove too high. In July 1892 the Electric Power Storage Co which had taken over the Electric Traction Co contract raised its rental to 7.5d/cm., and in Birmingham expenses exceeded receipts.

But hope still ran high: "the chief expense is the accumulator; when this is improved, and we believe there is a real advance in traction cells now in the market, there will yet be some hope for self-contained traction".¹ All the more so since "the inconvenience and objections to the exposed overhead wires prohibit its use in most cities, certainly in this country."²

Concurrent with these trials, some overhead trolley schemes were being initiated. The American Thomson-Houston Co equipped the Roundhay route for Leeds Corporation in 1891. Totally American technology was implanted into the industry, and it brought with it two serious drawbacks; the cars were single-decked, and the use of non-flexible trolley poles meant that the overhead wire had to be suspended at some exact locus through the length of the track and so called forth an inordinate amount of overhead work in the form of poles and span

¹ ibid 20.8.1892 Vol 31 p 259.

² ibid 9.9.1892 Vol 31 p 317.

wires. In the following year the South Staffordshire Tramway Co converted eight miles of their track to overhead traction following a threat by Walsall Corporation that its seven year steam licence would not be renewed because of complaints from the public. The company were also warned off erecting a fishnet over the town, and, in answer to the ultimatum, the flexible trolley was devised which allowed less rigorous track-wire parallelism and did away with a great deal of suspension engineering. The company also introduced double-decked electric tramcars.¹ By 1893 then, a British overhead trolley system was available, to be taken up by Bristol and Coventry in 1895, and Dublin in 1896. There was a technical reason why these towns in particular should lead the way; "owing to the great weight of the electric car, and to the fact that the power is applied to the wheels and not to a drawbar, the permanent way where electricity is used must be of a more substantial character than is usually considered necessary in cases of animal traction."² The electrified routes on these early lines had been laid originally for steam traction and

¹ Financial World article on Electric Tramways 7.1.1893.

² Tramway and Railway World (TRW) W G Carey Electric Tramways on the Overhead or Trolley Wire System. Vol 1 February 1892 p 69.

were thus already of adequate robustness.¹ These companies were the ones to electrify first because their conversion costs were lowest; they had only to hang overhead wires and bond their rails instead of replacing the whole track structure.

Up to this time then, (say 1896) experiments in electricification were timid. No company was totally committed to the overhead system: "successful and dividend paying tramway companies have been loth to increase their capital to such an extent as is required for electric equipment, the more so because few managers have as yet more than a hearsay knowledge of the subject. Less prosperous companies naturally hang back until others have obtained satisfactory results from practice."²

There was one other factor prohibiting innovation in the early 1890's. The National Telephone Company sought to protect its use of the earth as the return circuit for its telephone systems. Although the early traction trials used the track as the return link sufficient leakage was experienced to interfere with telephonic communication. Up to June 1893 the telephone company had protected itself by having clauses inserted into fifty-

¹ For data on steam routes see H A Whitcombe History of the Steam Tram 2nd ed. 1961

² Electrical Review Vol 38 7.2.1896 p 162.

two tramway provisional orders whereby the tramway companies guaranteed no leakage or pay compensation.¹ Such clauses virtually prohibited electrification, as in Glasgow,² since suitable insulation was either technically or financially out of the question.

The Joint Parliamentary Committee set up in 1893 to look into this monopoly situation reported in favour of the tramways. Modern telephone systems were by then using metallic return circuits anyway and the telephone company was shown up to be an undertaking doing everything it could to protect its obsolete capital. By the end of 1893 the legal and technical obstructions had been cleared away, but still progress was slow. Certainly the overhead wires did generate a lot of adverse public opinion. Even the Parliamentary Committee which had viewed with disquiet any retardation of electric traction developments did regard "with apprehension a large extension of the system of overhead wires in crowded street."³ Towns where tourism and architectural integrity were ranked important looked more to accumulator cars and conduit systems, as in Blackpool and central Bournemouth, or to cable operation as in Edinburgh. But even in 1893 public

¹ J.B.C. on Electric Powers op cit Q 8 gives a list of all the undertakings involved.

² ibid Q 2056

³ ibid Report para 9.

attitudes were beginning to mellow; speed was being considered as important as aesthetics.¹ The early 1890's saw the beginning of the next housing boom, and some new form of public transit was needed to meet the demand from the ever-receding suburbs. As this suburban demand increased, so the social costs of the dangers and unsightliness of overhead wires declined relative to the benefits of faster, cheaper, and cleaner transit. In the early years this demand was gestating and companies could afford to await further technical improvements, but when the housing boom took off in 1896 the industry's press claimed that the period of experimentation was over. "British engineers and investors have recognised this fact, and as a consequence, extensions of electric traction are now taking place with increasing rapidity."² Like all previous tramway innovations electrification was the result of passenger demand increases. Electrification, in implying increased capitalisation to produce lower working expenses required the industry to move into a higher demand field before overall gains could be realised. Only when a huge market potential had been identified could the industry attract the necessary capital.

¹ Railway World Vol 2 January 1893 p 492

² ibid Vol 6 May 1897 p 150.

The decision to introduce a new technique depends on its total costs being lower than those experienced by the current process of operation. If an innovation results in lower working expenses per unit of output while requiring a heavier capital outlay, then the conversion debate revolves around four functions - the magnitudes of capital increase and working costs decrease, and the state of current and anticipated demand. Letting K_o and K_n represent the capital charges per unit of output of the old and new techniques respectively, and W_o and W_n be their related working expenses, then the conversion function can be written as:

$$C \text{ is +ve when } K_n + W_n < K_o + W_o$$

The classic 'function' must also take into account the capital debt of the existing investment and so the final function reads:

$$C \text{ is +ve when } K_n + W_n + K_o < K_o + W_o$$

or $K_n + W_n < W_o$ since the life of the debt can be independent of that of the physical asset.

The capital budgeting procedures of the average British tramway company made this 'classic' function redundant in its case. In the 1890's there was little question of scrapping existing capital since most was virtually

scrap anyway; assets, although paid for, were worn out. In short, the K_0 on the right hand side of the equation was equal to zero, and the K_0 on the left hand side was equal to K_0' - the cost of reinvesting in horse tramways.

The industry of the 1890's faced the following conversion function:

$$C \text{ is +ve when } W_n + K_n < W_0 + K_0' \quad (W_0' = W_0)$$

As replacement demand grew the attractiveness of electric conversion ($W_n + K_n$) increased since the difference in magnitudes of capital commitment diminished as between horse and electric traction. In 1894 Glasgow Corporation Tramways manager reviewed the position in just these terms: the question of electrification "must be entered upon very soon, as some of the present lines laid in or about 1880 are nearly done. A good opportunity will therefore occur when reviewing these, of inaugurating a change of traction".¹ The electrification debate in Leeds in 1895 hinged on the fact that the cost of horse track renewals was around half the cost of total electrification,²

¹ General Manager's Report on Tramway Extensions; Glasgow Town Council Minutes 22.11.1894.

² Leeds Corporation Report op cit p 14 and p 28.

and the same ratio was found to be true in Aberdeen when its corporation was discussing conversion in 1899.¹

On the demand side an increase in the density of line useage would have the dual effect of reducing capital charges per car mile run and of enhancing the working expense savings of electrification. It was the combination of a growing need for line renewal and extension (which was continuously reducing the size of increased capitalisation of electrification) and the growing demand for transit (which lowered the unit costs of this capital investment) which resulted in the economics moving in favour of electric traction by the mid 1890's - see Appendix 3.1 for a full discussion of this point. In particular the demand for new lines did most to bring this about, and this, in essence, as the decade progresses, explains why Britain lagged behind America and Germany in the field of electric traction and consequently in the whole business area of electrical goods. In America there was a housing boom, and so a marked increase in transit demand, in the period 1886 to 1892, and in Germany a peak was reached in 1890²; whereas the British housing index did not turn down until 1899. An American commentator

¹ Aberdeen Corporation Minutes 20.2.1899

² P. J O'Leary and W A Lewis Similar Swings in Production and Trade 1870-1913 Manchester School of Economic and Social Studies Vol 23 1955 pp 117 and 130.

of the tramway scene summed up the issue succinctly in 1892; "We have preceded you because our needs are greater".¹

If in Britain, then, it was the financial impotence of the tramway companies which produced the track renewal crisis and accelerated electrification, how did the industry raise the vast sums of money for such electrical equipment? How did the industry raise its capital commitment from £13.5 million in 1890 to £20.5 million in 1900 and £58 million by 1905?

By the latest date 66% of British route mileage was being run by local authorities. Local councils, in the main, took full advantage of the Purchase Clause, and started working and re-equipping their tramways "for the better service of the community in matters, which, although not absolutely essential for life, are certainly essential for the well-being of the community."² This increase in municipal trading did not go unnoticed. Probably, at the heart of the matter, private enterprise was annoyed at missing out on a technical innovation which was to allow local authorities, for a short time at least, to charge lower fares, provide better service, and still

¹ R W Blackwell in discussion on Reckenzaum's paper op cit p 329.

² W J Jeeves Leeds Town Clerk to Joint Select Committee on Municipal Trading PP 1900 Vill Q 3044

claim returns for the community rather than for some select group of shareholders. For the years up to 1908 private enterprise had to endure the galling spectacle of public transport serving both God and Mammon, and many saw the day dawning near when the Bolsheviks would overrun Parliament after reaching Westminster on an assault fleet of blood-red LCC tramcars. To impute, as the "Times" of 1902 did, that the movement to municipalise the tramways of Britain had any deep political motivation is to misunderstand the wholly pragmatic nature of local politics at the turn of the century.¹

"To explain the development of municipal trading as the exclusive result of recognition of certain truths of economic theory would be to introduce a clarity which did not in fact exist."⁴ Rather, civic purpose steered municipalities into replacing private undertakings in two

¹ Times in 1902 published a series of seventeen articles in fanatical opposition to 'municipal socialism'; in the introductory article the paper quoted International Socialist Congress resolution of Paris 1900 which emphasised that municipal trading was a training 'in order to prepare and facilitate the coming of the Collectivist State'.

Articles were published on August 19, 23, 28 September 2, 5, 8, 10, 16, 18, 22, 25, 30. October 6, 13, 21, 30 and November 11.

² H. H. H. Finer Municipal Trading 1941 p 27

economic arenas where such enterprise persistantly failed; in industries where the most efficient organisation was the local monopoly, or where the social benefits were not accountable in financial returns. It was the latter reason which forced the local authorities into the building of water works and reservoirs and into the provision of parks in central areas: it was the former reason which instigated the Gas and Water Facilities Act of 1870 and introduced the Purchase Clause to the 1870 Tramways Act and the 1882 Electric Lighting Act.

By the 1890's it had been recognised that tramways could play an enormous role in relieving urban congestion, and that private enterprise was incapable of doing it.¹ Local authorities decided to purchase their tramway systems in order to plan their routes and regulate their fares, but not necessarily in order to run them. Municipal ownership did not imply municipal operation, and indeed, municipal ownership had been a possibility right from the start. What was new and unexpected in the 1890's was the explosion in municipal running of tramways, and it was this that raised so much controversy and anger, not municipal ownership per se.

The Tramways Act of 1870 forbade municipal operation under the Provisional Order procedure, but private acts could

¹ TRW Vol 2 January 1893 p 492.

include any clauses agreed by all relevant parties. Nine such acts, passed in 1870, allowed the relevant local authorities to operate the lines of the tramway companies in their areas.¹ In August 1872 Standing Order 171 was adopted which restricted local authorities working and so brought private bill and Provisional Order procedures onto the same footing.

The rule was first broken in 1882 when the Board of Trade granted operating rights to Huddersfield Corporation on the lines it had just constructed. The routes were too steep and no lessee was found to take them on; even the Hallidie Patent Cable Tramway Company eventually refused an offer in 1883,² and so, with the corporation reluctantly assuming operational status the principle of municipal working was conceded, as long as such working was expected to be unprofitable. No further moves were made in the decade and for the first twenty years of the Tramways Act the only example of municipal operation was the result of bad planning. The "Huddersfield clause" was not inserted into any Provisional Order until 1892 when Blackpool Corporation found themselves with a lessee unwilling to renew his seven year operating licence for conduit track along the sea front. Dissolution of

¹ London, Glasgow, Birmingham, Portsmouth, Plymouth, Sheffield, Greenock and Vale of Clyde.

² Railway Times Vol 46 14.4.1883 p 392 - refers to initial agreement.

Parliament waylaid the bill and in the interim the corporation assumed running powers. In the following year the clause was inserted into several bills,¹ and now local authorities had an opportunity to take over actual operation since stringent conditions could make lessees difficult to find. The whole concept of municipal operation had to be conceded in 1896 when the passing of the Light Railways Act gave local authorities the power to construct and work such railways.² Standing Order 171 was suspended because of difficulty in finding a legal distinction between a light railway and a tramway.³ It must be emphasised therefore, that it was not until the mid-1890's that companies realised that their expectations of re-leasing their systems after selling them to the local authorities were not to be. Consequently, in the years preceding impending municipalisation the industry was unconcerned: "Nothing could be more equitable, and there is nothing in such arrangement to cause the slightest alarm to shareholders."⁴ That was written in 1888,

¹ Newcastle, Newport, Blackpool and Plymouth.

² Hansard Vol 60 (4th ser.) 4.5.1896 cols 420-427

³ Pressure to abandon SO 171 originated from the MP for North Leeds where the local authority were dissatisfied with company service: H H Lancaster The growth of the Leeds Municipal Transport System in Journal of the Institute of Transport Vol 17 March 1936 p 305.

⁴ Duncans Tramway Manual 1888 p 3.

but the complacency was bred out of an overoptimistic interpretation of what exactly constituted the 'then value' of the undertaking as stipulated by the 1870 Purchase Clause. Many company directors read this as meaning a valuation based on the earning capacity of the network at the date of the purchase. They hoped for a lump sum with which to replace worn out rolling stock, and then to run it on track renewed and extended by the local authority. Even the thought of getting simply scrap value for the lines was not considered unduly worrying: "In fact, the position of the shareholders would be in any case very slightly affected, for if the price given were not the then value, which I take it it must be, but were only the value of the old material, the lines would be re-leased to the company at the rate at which the local authorities would raise the money with which to purchase them, and consequently the shareholders would receive dividends diminished only to the slight extent of the interest on the capital raised by the local authorities."¹

The valuation issue came to a head in 1894 when the disputed arbitration awards for the lines of the Edinburgh Street Tramways Company and the London Street Tramways Company came before the House of Lords. Their ruling was given in

¹ W J C Main Managing Director of North London Tramway Co. in Railway Times Vol 51 28.5.1887 p 691.

July.¹ All parties agreed that 'tramway' meant the lines themselves, and that it was not synonymous with 'undertaking.' The argument lay in how to value the lines. The referees had chosen 'constructive' valuation while the companies sought rental value, or what the lines would earn when leased out by the authorities. The Law Lords decided that the right of ownership of the lines did not assume the right of user. Since "the exclusive occupation and use of any portion of a public street or highway, whether by an individual or a company, is at common law, an invasion of the rights of the public,"² tramway companies through the 1870 Act acquired the right to use flanged wheels on the track, this right being a statutory privilege terminable on the sale of the tramway to another party. Thus, when a local authority wished to purchase the undertaking in keeping with Purchase Clause conditions, the fact that it had the legal right to do so meant that the company had lost the right of user and so the lines became useless to it from that

¹ House of Lords July 30 1894. *Edinburgh Street Tramway Company v Edinburgh Town Council and London Street Tramways Company v LCC*. Quoted verbatim in Duncans Tramway Manual 1895 pp 284-300.

² *ibid* Lord Watson's judgement.

date. This was the basis of valuation; there was no question of scrap valuation, rather the companies were to be given the book value of their lines. Considering the companies paid little or nothing for the ground upon which their rails were laid, and that they had received the privilege of use for nothing or nearly so, there is little to criticise in the valuation procedure. The Lords adhered to Tennant's valuation principle for the Edinburgh track: "the proper value of the said tramways to be determined by me, according to my construction of the statute, is such a sum as it would cost to construct and establish the same, under deduction of a proper sum in respect of depreciation to their present condition, and that in estimating such cost, I am entitled to take into account the fact that the said tramways are now successfully constructed and in complete working condition."¹ Companies were to be given the book value of their track assets while the companies themselves sought a capitalised value on potential future earnings. This latter principle was categorically denied them in the 1870 Act, but it promised a higher valuation. The trouble was, as noted earlier, that companies had not been following correct, if any, capital depreciation accounting, and what they were in fact trying to do was narrow the gap between their valuations and the real value of their assets.²

¹ loco cit.

² J C Robinson of the Provincial Company did build up reserves to counter the Purchase Clause, but in general

To argue as Vesey-Knox did,¹ that the official valuation procedure in itself retarded electrification is to condone the accounting errors of the tramway company. The principles decreed by the House of Lords were financially neutral if sufficient reserves had been amassed, the more so since the Lords also ruled that local authority working was forbidden. Within this legal framework, any go-ahead company could invest in electric equipment and fully expect to reap the benefits of lower working costs after re-lease. Indeed, the actual payments made in the late 1890's came more as a windfall than a downfall since any move to electrify would have meant scrapping existing assets anyway. One tramway promoter saw the changeover from horse to electricity as a period of extensive clearing out when there was "hardly anything left which is worth anything".² Further the Lords' decision affected only the track which covered about half of the expenditure of electrifying. Generation plant and rolling stock could be kept or sold at prices

cont. "a man uttering such an opinion (as ruled by the HoL) was then merely a voice in the wilderness whom nobody regarded" Light Railway and Tramway Journal (LRTJ) Vol 4 May 1901 p 187.

¹ E F Vesey-Knox The Economic Effect of the Tramways Act of 1870 Economic Journal Vol XI 1901 pp 507-510.

² JSC on Municipal Trading 1900 op cit Q 1533

arrived at under normal bargaining procedures; in terms of the hypothetical electric tramways company of 1894, such plant would remain in its control to be sold to the future lessee which could only be itself or some other private operator. In this instance, at least half of its capital would be valued on the basis of future earning capacity.

In practice, valuation was mostly arrived at "by negotiation, on more equitable terms"¹ Since lines had been built at different times throughout the previous thirty years and so came under the purchase clause threat at different times, it was in neither the buyer's nor the seller's interests to deal in fragmented systems, and so in general, realistic prices were forthcoming. Nottingham Corporation went as far as buying over their tramway company's shares at par.

The whole valuation issue was a red herring; although company capital accounting was piscine to say the least, company proponents emphasised the redness of municipal control and played the martyr for Fabian Socialism. For the industry to judge the Lords' ruling as one under which "private enterprise cannot any longer be relied upon to supply financial support"² was somewhat heroic

¹ G A Lee The Tramways of Kingston-upon-Hull PhD thesis Sheffield University 1967/68 p 253.

² Duncans Tramway Manual 1895 p VI

considering the lack of financial support experienced in the previous decade.

Those who argued, and argue, that municipal socialism retarded electric tramway development¹ are wrong on several counts, with the primary one being that the demand for faster transit did not emerge until the end of the decade. Liverpool Tramways Company announced its intention to electrify in 1893 and negotiated a lease extension towards that end, but when the Corporation reversed its ruling in 1897 nothing had yet been done.² At the micro-level companies had no reason to foresee municipal operation until 1896, and even then leasing seemed probable as "friendly compromises between the companies and local authorities",³ Most critics of municipal trading viewed the collapse of private tramway enterprise from hindsight, and the coincidence of local authority purchase and company insolvency was too much

¹ R P Porter The Dangers of Municipal Ownership 1907 p 241, Rt. Hon. Lord Avebury On Municipal Trading and National Trading 1906 pp 94-107 L Darwin Municipal Trade 1903 p 17.

² S A Munro Tramway Companies in Liverpool 1859-1897 Transactions of the Historical Society of Lancashire and Cheshire Vol 119 1967 p 207.

³ Railway World Vol 5 April 1896 p 105.

to disregard. "The unhappy effect of the limited tenure arrangement was to force tramway undertakings into a premature condition of senile decay. No money (except what was absolutely necessary) was spent on renewals, or rolling stock, or permanent way ..."¹ But this 'senile decay' was the outcome of poor capital budgeting, and the actual limits of the tenure arrangements were not appreciated until after 1896.

Notwithstanding this, if it were conceded that the Purchase Clause rather than insolvency, inhibited capital expenditure, then municipalisation must be seen as the cause of the permanent way renewal crisis which in turn made electrification viable several years ahead of purely demand conditions (see Appendix 3.1). Municipalisation, at the very least coincided with electrification, it may even have hastened it, and it certainly did not retard it.

One other boost was given to the tramway industry in 1896. Rural depression forced Parliament into relaxing Board of Trade regulations and legal procedures so as to encourage light railway building in an attempt at lowering agricultural input and output distribution costs.² The Light Railway Commissioners could grant Light Railway Orders without many of the formal veto possibilities of the 1870 Act. The Government recognised

¹ R P Porter op cit p 242

² Hansard Vol 37 20.2.1896 col. 736.

that the social benefits of light railway building would probably be accompanied by dubious financial returns and so the local authorities were actively persuaded to build and operate them, backed up by Treasury grants. It was this concession to local authority working which heralded in widescale municipal operation of tramways and light railways rather than the building of new lines under Light Railway Order. It is very difficult to estimate the amount of LRO tramway built since so many orders were never implemented, but by 1918 such mileage was put at 363, or 20% of all tramway built since 1896.¹

The last influence of the 1896 Act was structural: the British Electric Traction Company was set up directly to utilise the easier preconditions for line building, and it became the leading private enterprise operator in the country with control over 15% of total U.K. mileage in 1906.²

The 1890's was a period of technical and financial trauma for the tramway industry. The collapse of private companies resulted in services of such poor quality that municipalisation became inevitable, but it must be emphasised that the former caused the latter, and not

¹ Second Report of the Select Committee on Transport 1918.
PP 1V Q 20. Electrician Electric Tramway Supplements 1898-
1913 puts the figure at 250 miles, or 14% of mileage by
1913. Supplement Tables 1V, V, VI 19.12.1913.

² R Fulford Five Decades of British Electric Traction
1946 p 38.

vice versa. However, municipal ownership was not *deus ex machina* for an insolvent industry: local authority insistence on low fares and route extensions, and their disregard for the social returns of the service, aggravated horse tramway profitability from the outset. But here again, the councils were merely trying to ensure the advantages which the promoters had put forward in the early 1870's, and the industry was being dragged down by burdens which the original promoters had had no intention of carrying themselves.

Miles of electric tramway rose from 20 in 1890 to 93 in 1897, and then expanded rapidly to 2637 by 1913. Horse mileage fell from its peak in 1897 to around 200 in 1903, and then gradually disappeared: the same applied to steam tramways (see Figure 3.1). Electrification brought about a fall in working expenses from over 9d/cm in the 1890's to 6.5d in the 1900's, with the power costs accounting for almost all of the fall. They fell from 4.5d/cm to 1.5d/cm over the same period (see Figure 3.2). Most of this saving was passed on to the consumer in the form of reduced fares. Revenue per car mile dropped from around 12d to 10.5d over the two decades. By the early years of the twentieth century Britain had an efficient, cheap and up-to-date tramway network, and proponents of municipal enterprise were well satisfied. "The history of municipal tramways is largely a story of the transfer of inefficient private enterprise under-

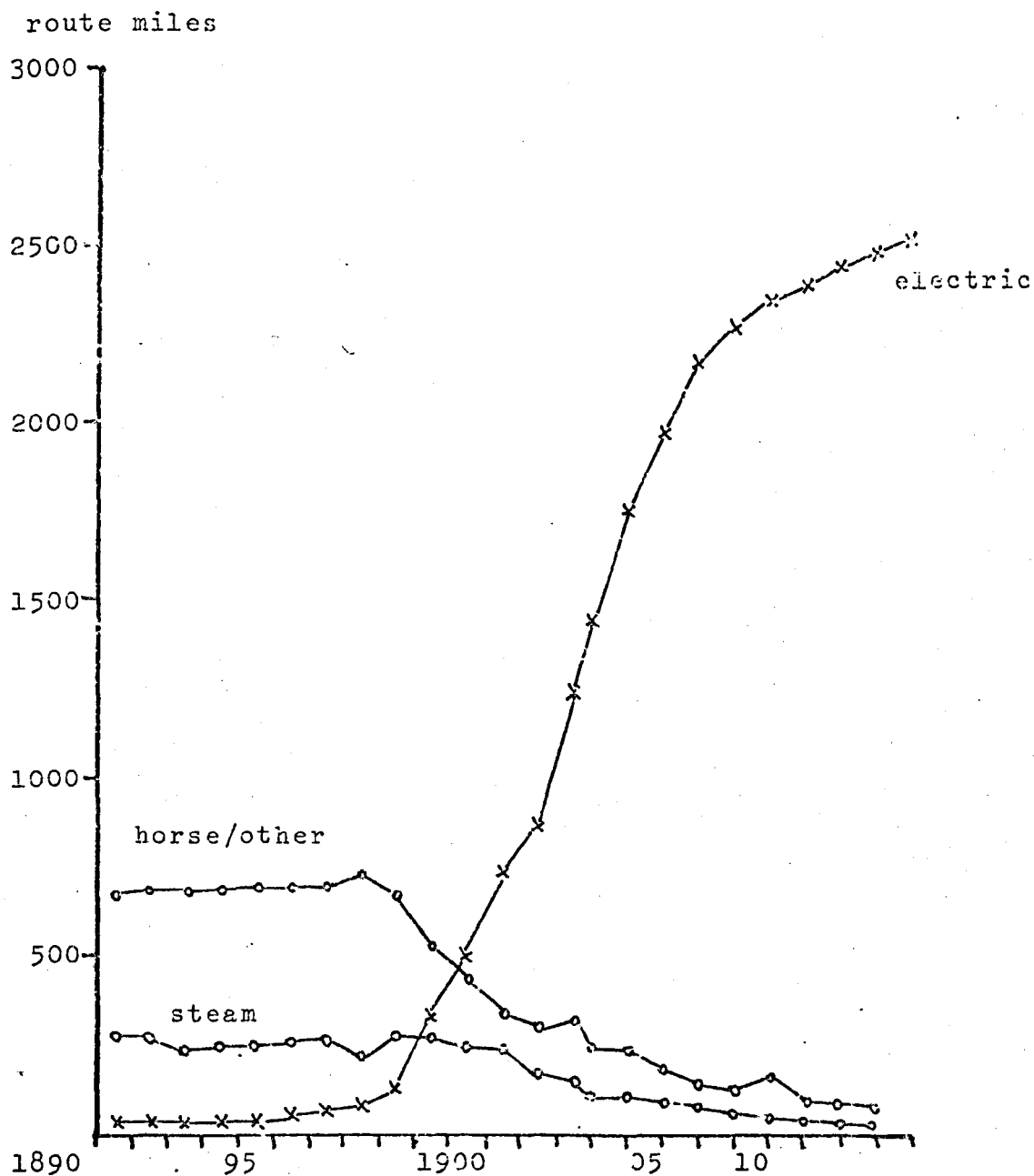


Figure 3.1 Route miles of track by different traction systems.

Source: See Statistical Appendix Section One.

takings at high prices, and their transformation into convenient and well equipped services, paying better wages, and charging lower fares."¹

In the midst of this self-congratulation, the seeds of ruin were being sown. "The real danger in the situation lies, in fact, in too great confidence that these increases will continue. Each year on the announcement of their results, a host of suggestions for reduction in fares, increases in wages, and extensions of lines are made to the Councils and urgently pressed upon them. Political considerations often receive undue weight, and unless the officials of the tramway department have great influence with their committees, and the chairmen of the committees have equally great influence with the councils, concessions are granted that cannot be revoked, and that may seriously hamper the department in later years."² Local councillors found route extensions into their wards produced immense kudos, and fare reductions were an easy way to success at the November elections.³ Professional transit men could do little but object; they viewed fare reductions as "no doubt very laudable and very nice, but ... not business,"⁴ and they had to

¹ R B Suthers Mind your own Business 1905 revised edition 1938 p 17.

² TRW Vol 13 14.5.1903 pp 461-462

³ LRTJ Vol 16 1.3.1907 p 133

⁴ ibid Vol 13 1.9.1905 p 163.

operate lines which had been built because they had "looked pretty on a map".¹

..... "Bloom: (in alderman's gown and chain) Electors of Arran Quay, Inns Quay, Rotunda, Mountjoy and North Dock, better run a tramline, I say, from the cattle-market to the river. That's the music of the future. That's my programme. Cui bono? But our buccaneering Vanderdeckens in their phantom ship of finance An Elector: Three times three for our future chief magistrate!

(The aurora borealis of the torchlight procession leaps)."²

Municipal tramway building leapt forward on this wave of socialistic enthusiasm and flourished in a 'one-in-the-eye' attitude towards private enterprise. Few councils gave heed to forecasts of financial difficulty³ or read their tramway manager's writing on the depot wall. In their eagerness to pass on cost reductions, councillors lost sight of the vast capital expenditures it had been necessary to undertake in the realisation of these savings. Capital expenditure per par route mile had increased from the horse traction figure of £14,500 to £26,000 in the 1900's. Since the lifetime of both electric and horse assets were roughly the same, extending over 15 years,

¹ LRTJ Vol 19 6.11.1908 p 326.

² J Joyce Ulysses 1922 referring to 1904. Penguin edition p 455.

³ LRTJ Vol 19 3.7.1908 p 1.

then, with similar density of useage, electrical depreciation allowances should have been 80% higher than the model horse reserves (£26,000 is an 80% increase on £15,000). However, between the 1890's and the 1900's line use density increased by 50% from 80,000 car miles per route mile per annum to 120,000, thus actual depreciation allowances per route mile should have been only 30% higher than the model horse depreciation charge of the 1890's, and should thus have been in the region of 3.5d/cm (see page 57). Since actual depreciation reserve payments in the 1890's were around 0.3d/cm, the reduction of 3d/cm experienced on the working costs of electric traction should have been used finally to put tramway capital accounting onto a sound footing while maintaining existing fare structures. Electrification offered the solution to the problem of increasing capital expenses and fixed fares encountered by the struggling companies of the nineteenth century, but those who now controlled the industry had taken on obligations to lower fares, and were more than content to do so because their method of capital charge calculation differed from that used in other spheres of economic activity.

The municipal capital budgeting methodology quickly threw up the spectre of municipal indebtedness.¹ At first opponents pointed to growth of local authority debt and

¹ Sir H H Fowler M.P. Municipal Finance and Municipal Enterprise Presidential Address Journal of the Royal Statistical Society Vol 63 1900 pp 383-407.

equated this with contemporary economic stagnation.¹ This theme was pursued in the Joint Select Committee on Municipal Trading of 1900 which found the case not proven, and wisely turned its attention to municipal accounting when it was reconvened in 1903.² Private enterprise champions had at last found non-emotive vantage points from which to attack municipal trading. Discussions about the disinterestedness of councils, their concern for the good of the community being curtailed only by the pressures of council work, and arguments on how to distribute municipal profits, all these concrete considerations readily collapsed into a general capitalism/socialism dialogue where the boulders of emotive conscience easily crushed the pebbles of economic logic upon which the whole structure was later found to balance. By 1908 municipal adherents were on the defensive;³ the previous year's local elections had gone against them and this stemming of the tide showed how shallow had been Britain's attachment to the socialist

¹ Lord Avebury The Growth of Municipal and National Expenditure Presidential Address Journal of the Royal Statistical Society Vol 64 1901 pp 73-84.

² Joint Select Committee on Municipal Trading 1900 V11 and PP 1903 V11.

³ G B Shaw The Commonsense of Municipal Trading 1908. Fabian edition introduction p 8.

ideal. Tramways were one of the major undertakings involved, both financially and in terms of the numbers of people served, and by 1908 municipal control was proving untrue to its word. Low fares produced inadequate reserves, and by now repairs were imminent. Many local authority tramways ceased to aid the rates and became subsidised. The move away from municipal trading enthusiasm marked the end of the honeymoon during which financial success and municipal zeal walked hand in hand. Now that the true costs of socialist policy were becoming apparent, now that ratepayers were being asked to subsidise a service enjoyed by most of them anyway, economic profitability returned as the prime object of policy, and tramways began to revert to a role private enterprise would have played. Local councils sought to cover costs, they built fewer lines, and considered all proposals from the standpoint of economic viability. Emile Garcké had had the foresight to see this outcome because he identified at the time the lack of any philosophical goal in current municipal operations: he was to be proved correct in his statement that "there is no economic or moral advantage in transferring the conduct of industrial undertakings to the Government if such undertakings are to be carried on in the same manner and with the same aims as characterised industrial enterprise when in the hands of individuals."¹

¹ E Garcké The Limitations of Municipal Enterprise 1900 p7. He was general manager of British Electric Traction and so had great knowledge of the tramway scene.

Local councils had got themselves into this financially compromising situation, not because they were too lax or complacent, but because they had fallen foul of the inter-temporal pitfalls of community activities - which generation was to pay for the long term assets of the tramway undertakings?¹

Previous to the introduction of tramways, local authority investment had concentrated on waterworks, sewers and parks, long term undertakings of an 'unreproductive' nature, that is, they were essentially social services where financial considerations were secondary. Government loaned money for a period equivalent to the life of the asset which was normally around thirty years in the case of sewers and housing since obsolescence potential was taken into account, and in the case of longer term investments in parks and waterworks where repairs and renewals could be covered by revenue, the maximum loan period was set at sixty years to ensure that the present generation did not squander the moneys of future ratepayers. With tramways, the estimate of a thirty year life span was soon proved to be overoptimistic yet loans were given on this basis since the 1870 Act had recommended its implementation. At best, after thirty years the debt would be repaid and the assets would be worthless;

¹ Much of what follows is taken from S H Turner Depreciation and Sinking Funds in Municipal Undertakings Economic Journal Vol 14 1904 pp 47-56

at worst after fifteen years, the assets would be useless and the loan would have to be doubled. In either instance, the tramway undertaking would be in a state of permanent indebtedness, and yet it had always been Government policy to prevent such municipal financing.¹ In practice local authorities fulfilled their Sinking Fund obligations and considered a depreciation fund to be superfluous. In England "the municipalities are looking to the day when their track is down that they will go to Parliament, and say, 'Our track is down, we want to reborrow the money we borrowed before'".² Others argued that to build both depreciation and sinking funds was tantamount to paying for assets twice in the first loan period. Local authorities were gradually impressed by the fact that earlier boasts of having the ability to raise money at 3% was not quite so advantageous; they had to pay the money back while private undertakings had no such commitments, on their ordinary share capital anyway.

In 1909 Knoop estimated that only 58% of the necessary depreciation was being put aside in England and Wales, while the addition of the more financially scrupulous Scottish systems raised the percentage to 79%.³ In 1911, of the

¹ Select Committee on Repayment of Loans by Local Authorities PP 1902 Vlll Report p iii.

² LRTJ Vol. 15 5.10.1906 p 299.

³ D Knoop Principles and Methods of Municipal Trading 1912 p 164.

total local authority depreciation reserves of £975,504, 72% was provided by only six undertakings which in turn accounted for 42% of total local authority tramway investment. To put it in another way the thirteen corporations with reserves exceeding £10,000 could claim 83% of the total depreciation amount and 52% of the capital expended in toto.¹ In the majority of undertakings especially the small ones, renewal and depreciation reserves were built out of 'net surplus revenue', that is, if there was any available after contribution to the rates.

"It can therefore be stated without any hesitation that the provision made for renewals and replacements by many municipal undertakings in this country is inadequate."² This inadequacy meant rate assistance as track wore out; by 1911 34 of the 88 municipally operated tramway systems could not even cover their working expenses³ and the policy of charging line repairs to revenue account was failing once again. Private tramway concerns suffered the same ills since non-owning municipalities could force fare reductions and line extensions under threats of hostile

¹ Board of Trade Tramway and Light Railway Returns 1911/1912.

² D Knapp, loc cit

³ J H Rodgers Tramway Finance and Policy LRTJ Vol 25
6.10.1911 pp 231-245.

publicity, and increases in rateable value, and the like. In the early years of the century the "company Caesar and the municipal Pompey were very much alike in their treatment of the question" of depreciation. "Neither the one nor the other seems to think that the matter is pressing at the moment, and both appear to be rather pleased to postpone action to some more convenient season."¹ British Electric Traction started to pull out of their tramway interest after 1906 because of the pressure from local councils for fare cuts. Their attempts at fare increases led to the boycotting of their tramcars and a permanent loss in custom.²

Figure 3.2 shows the overall financial condition of the industry throughout the early 1900's; revenue managed to cover working and sinking fund costs while depreciation was very much the afterthought. As track wore out the decline in service standards enhanced the advantages that any new transport mode could offer. The First World War spawned such a rival and gave the crippled tramway industry a kick in the shins into the bargain.

¹ LRTJ Vol 14 6.4.1906 p 203.

² R Fulford op cit p 38.

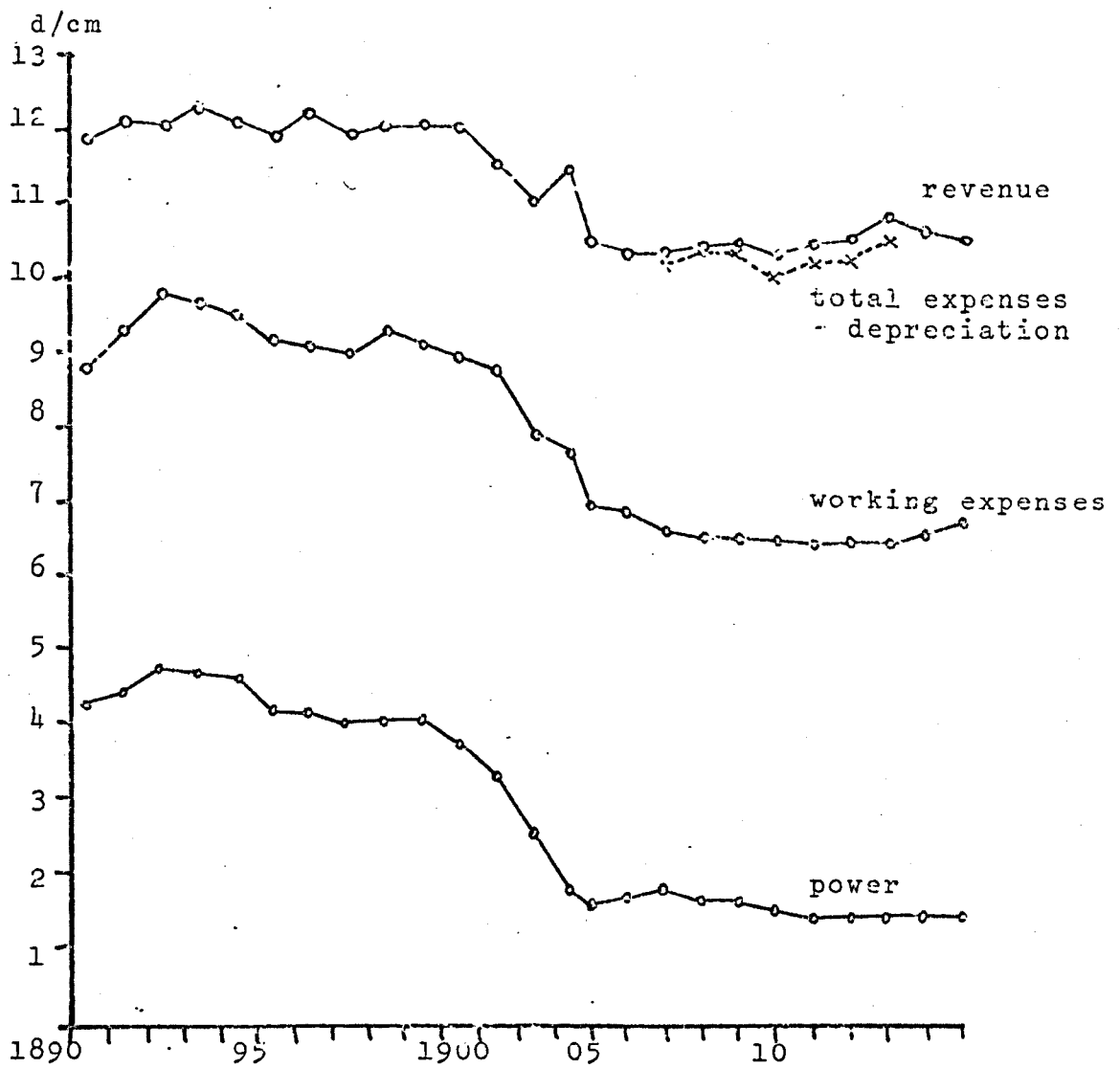


Figure 3.2 Average costs and revenue 1890-1914

Source: See Statistical Appendix Section One.

Appendix 3.1

The Optimum Electric Traction Conversion Date.

Electric traction conversion could only be justified financially when its total expenses were estimated to be less than those associated with animal traction. On the capital account side the decision depended on current demands for track renewal and extension, while on the operating account, anticipated cost savings would rise with an increase in car mileage. In the following analysis we shall look at two possible states in which the 1890's tramway industry could have found itself and see which one produces the earlier viable conversion date. Two states are:

a) code $(r+e)_c$ - the industry is aware of renewal (r) and extension (e) demands, but does nothing and lets them cumulate

b) code $(r+e)_s$ - the industry builds new track and renews existing track as and when it is required.

The former state is indicative of an inefficient and stagnant industry while the latter represents the efficient industry.

In any year, the relevant conversion equation facing the industry is to convert (C is +ve) when

$$K_h(r+e) + W_h \geq K_n(t+e) + W_n$$

where K_h is the capital cost per annum per route mile of horse tramway, and K_n is the equivalent costs for the new technique of electric traction, W_h and W_n are their respective working expenses. That is, it pays to convert when the savings due to the lower working expenses of the new mode - $W_h - W_n$ are greater than the extra capital commitment of conversion as against the capital expenditure required to remain in horse traction in any year i.e. $K_n(t+e) - K_h(r+e)$ where t is the size of the total system in route miles. Since the working expenses are in terms of pence per car mile (d/cm) the final conversion equation reads:

$$C \text{ is +ve when } W_h - W_n > \frac{240}{cm} (K_n(t+e) - K_h(r+e)).$$

* This implies that a mixed horse/electric system was unreasonable, and so electrification had to be considered across the entire system.

We can now solve this equation to find out when the two industrial states described produce positive C's.

The cost of building and equipping a mile of horse tramline was £10,000¹, which, given a life of fifteen years and

¹ Leeds Corporation Report op cit passim.

a borrowing rate of 3% results in an annual debt charge spread over the life of the asset of £827 per route mile. $K_h = £827$.

For electrification the cost of track replacement was £6,000 per route mile with another £2,000 for overhead work. The cost of generating plant and cars at £750 each raised the total cost per route mile to around £14,000.¹ With similar life span and interest rates the annual charge was £1,157 per route mile. $K_n = £1,157$.

The working expenses for horse traction in the 1890's was 9.67d/cm (1890-1895 average) and the actual working expenses for electric operation was 6.38d/cm (1902-1906 average).

$$W_h = 9.67d \text{ and } W_n = 6.38d.$$

¹ ibid. See also J S C on Electric Powers 1893 op cit. evidence of E Hopkinson. The estimate of £14,000 is quite acceptable. In the 1900's capital/route mile in the UK was £26,000 with around £10,000 due to previous horse investment. It is valid to state generation and rolling stocks costs on a per mile basis since the larger the system the more generating and seating capacity is required. There might well be economies of scale, but these would not be large enough to alter substantially these ballpark figures.

Since electrification was not a serious possibility until say, 1890 we shall make $t = 967$ miles, the length of non-electric tramways in Britain in that year.

The conversion equation now reads:

$$C \text{ is +ve when } 9.67 - 6.38 > \frac{240}{\text{cm}} (1157(967+e) - 827(r+e))$$

The line demand programmes identified by the two states are set out below. Renewal demand has been calculated on the basis of a fifteen year renewal cycle, and extension demand has been estimated by simply bringing forward actual line building statistics by five years. In other words, it is postulated that the latent demand for extensions in 1895 was equal to the line construction of 1900. Such a five year time lag is identified in Figure 7.12 and corresponds with the housing demands of the time.

Route miles of track

(Subscript s = satisfied; c = cumulative)

	r_s	r_c	e_s	e_c	$(r+e)_s$	$(r+e)_c$
1890	36	36	7	7	43	43
1891	16	52	27	34	43	86
1892	55	107	22	56	77	163
1893	52	159	33	89	85	248
1894	47	206	58	147	105	353
1895	120	326	55	202	175	528
1896	76	402	128	330	204	732
1897	107	509	179	509	286	1018
1898	81	590	288	797	369	1387
1899	70	660	345	1142	415	1802
1900	91	751	123	1265	214	2016

Source. Statistical Appendix Section 1.

If we now combine this data with car mileage figures for the relevant years, the capital cost difference of the two techniques can be calculated. However, we cannot use actual car mileage data since this does not reflect the anticipated mileage due to system extensions.

To overcome this we shall assume that the decision-taker expected the line density (cm/m) on the extensions to be the same as that on his existing system. The car mileage data is thus:

$$\text{actual cm} + \text{actual cm/m} \times e$$

This formula produces the mileage data set out below.

	actual cm (000's)	actual cm/m (000's)	anticipated cm (000's)	
			e_s	e_c
1890	65175	68.75	65656	65656
1891	67934	70.54	69838	70332
1892	70018	74.08	71648	74166
1893	70339	73.27	72757	76860
1894	71525	73.36	75780	82309
1895	75180	76.56	79391	90645
1896	81253	80.53	91561	107828
1897	84644	82.10	99340	126433
1898	90594	85.14	115114	158450
1899	96078	85.63	125620	193867
1900	108666	92.32	120010	225451

Source. Statistical Appendix 1.

Armed with these data series the capital cost differences are set out in the table below.

Capital cost differences d/cm

	State $(r+e)_c$	State $(r+e)_s$
1890	3.99	3.99
1891	3.71	3.83
1892	3.39	3.62
1893	3.17	3.59
1894	2.90 +	3.48
1895	2.39	3.13
1896	1.99	2.87 +
1897	1.64	2.79
1898	1.35	2.39
1899	1.17	2.24
1900	0.97	2.16

The above results can be used in assessing the validity or otherwise of the argument that municipalisation retarded electrification. The first thing to note is that the inefficient industry throws up an earlier conversion date than the efficient one. To argue for an early conversion date means that one must first accept that the industry was stagnant. We say it was because of company mismanagement, the opponents of municipalisation say it was so because of impending local authority purchase. However, if there were no purchase threat the companies, we are told, would have been efficient, and their very rapidity in taking up line renewal and extension programmes would postpone conversion by two years. It was the mounting capital

investment necessary to simply remain in the industry at all - $K_h r_c$ - which continuously lowered the opportunity cost of electric conversion.

As we saw in Chapter 3, companies were stagnant by the 1890's for reasons of bad capital accounting. By 1894 the industry was ready to convert but it took the act of municipalisation for the necessary funds to become available. In all, however, the basic lesson to be drawn from this analysis is that the demand of track renewal and extension produced no economic reason for electrifying before the mid 1890's. The main impact of municipalisation lay in its capital infusion capability. New electric tramway companies rarely had the opportunity to exploit the high demand central business areas already occupied by existing tramway operators and so they had to await the further extension of the housing boom when suburban and small town transit increased to a critical level, hence there was little influx of private funds into tramways until 1902. The numbers of private tramway undertakings fluctuated around the 115 mark over the period 1895 (115) to 1902 (115) and suddenly shot up to 154 in 1903 and 146 in 1904, and this at a time when private concerns were being bought over by local councils.

Although it is gratifying to find that the conversion model produces results in keeping with the evidence of company inefficiency and the rising demands of the

housing boom of the late 1890's, it can still be questioned on the grounds of being an aggregative model, and that a general tramway index and a national housing index might hide some more fundamental causal relationships or deny their existence.

Figure 3.3(a-f) shows the building cycles - here taken as a proxy for latent transit demand changes - and line replacement profiles of the cities of Birmingham, Leeds, Sheffield, Glasgow, Liverpool and Manchester. In all cases except Manchester and Birmingham, the first electric tramway lines were opened in an era of rising demand. In towns like Sheffield and Leeds, and to a lesser degree Glasgow, there was no significant replacement echo and so the track, assuming a double echo of around 25 to 30 years, was due for total renewal in the late 1890's. In Liverpool the renewal echo peaked in the era of rising demand, and as a result these four cases are typified as experiencing both renewal and extension demands simultaneously. In Manchester and Birmingham the echos came slightly before extension demands, but sufficiently so to lessen their combined influence since any urgent replacement would in turn increase the overall capital costs of electrification.

Obviously it is not being put forward here that the above analysis explains the timing of conversion in the various cities; what is being argued is that these considerations had an important influence on the political and economic decisions regarding the changeover from horse to electric

Housing Index (1900-09=100)
Tramway Route Miles

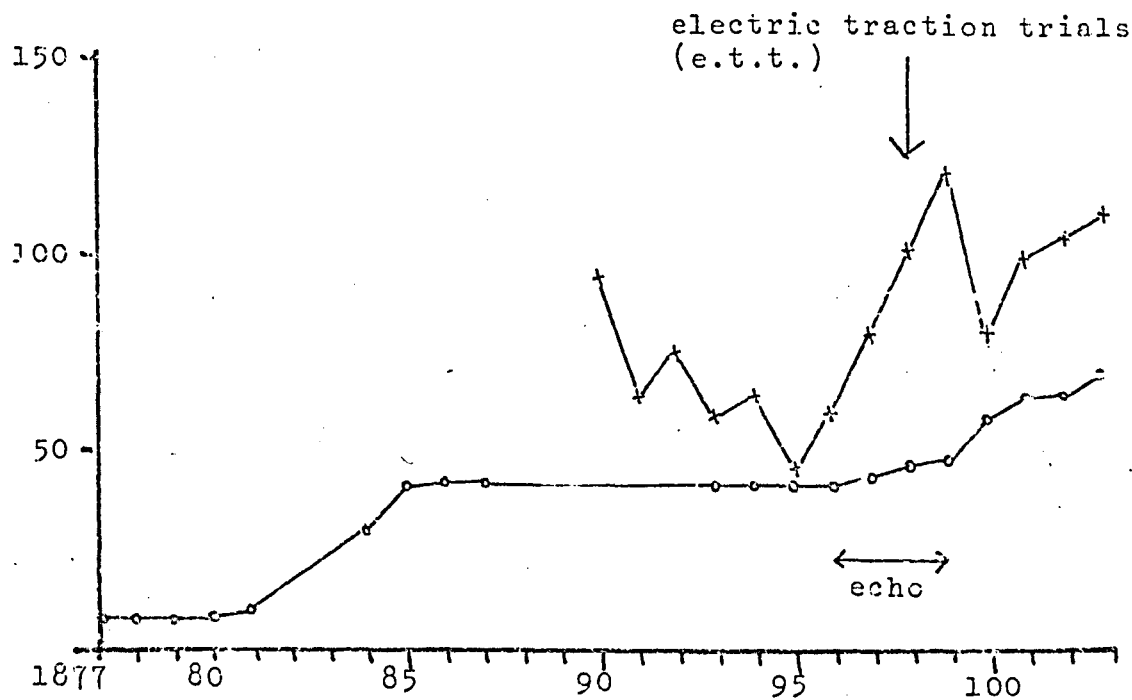


Figure 3.3.a. Liverpool: Housebuilding and Tramway Constuction

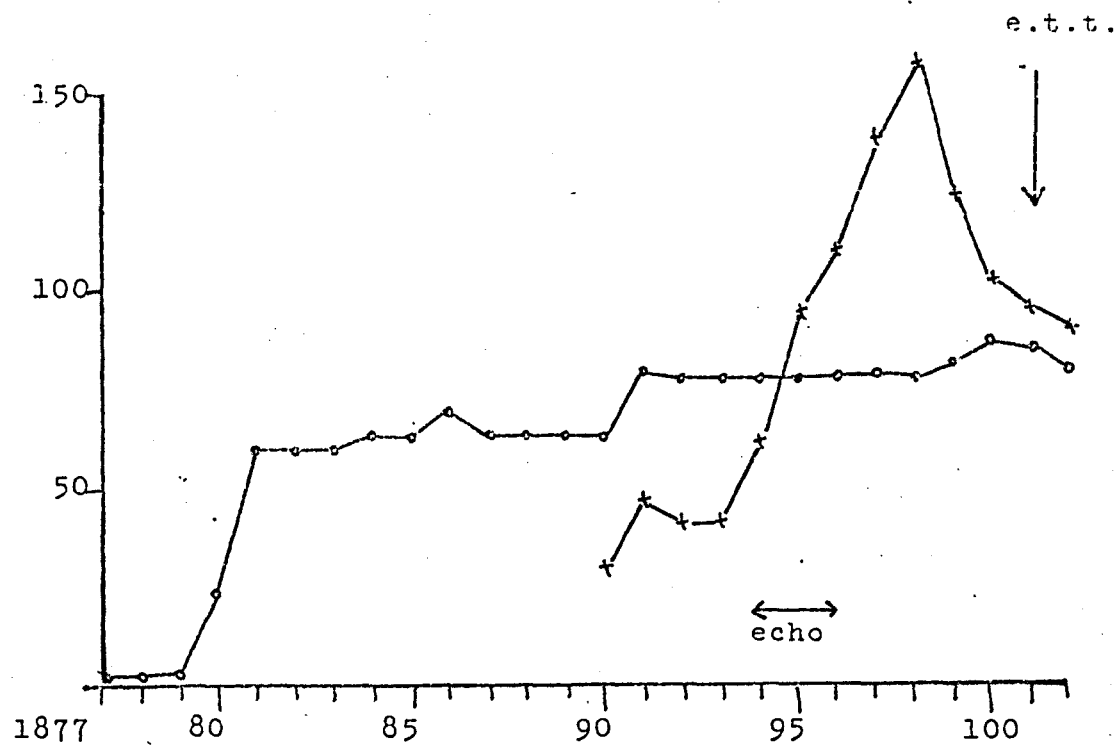


Figure 3.3.b. Manchester: Housebuilding and Tramway Construction

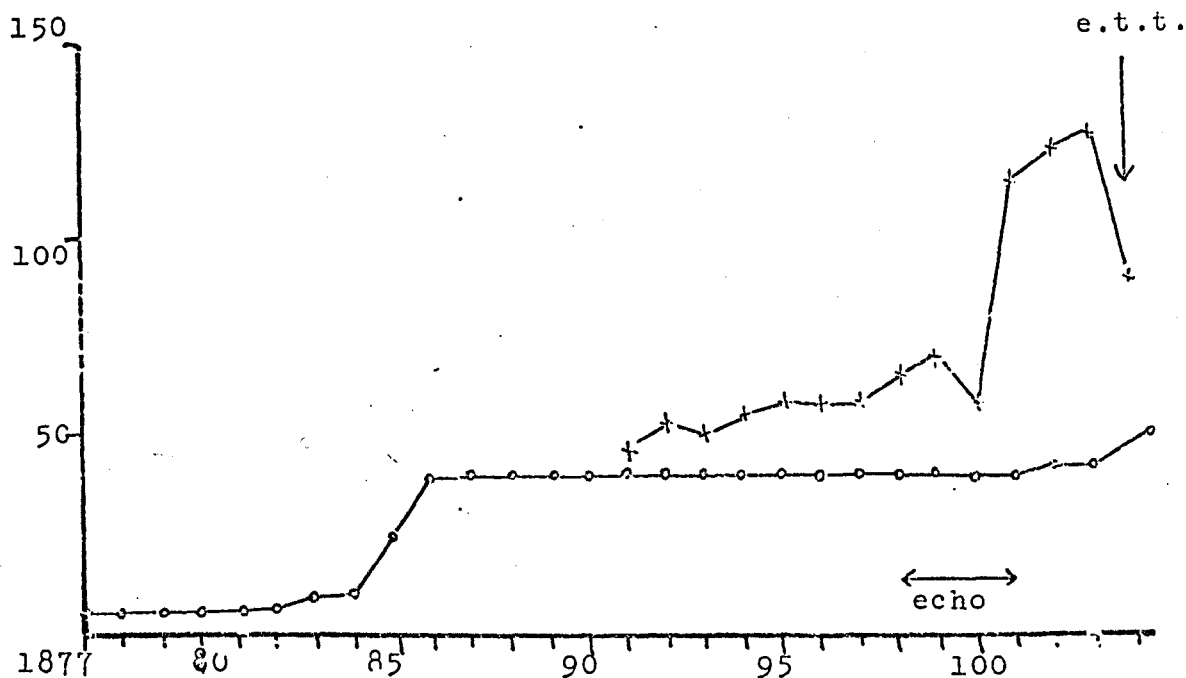


Figure 3.3c. Birmingham: Housebuilding and Tramway Construction

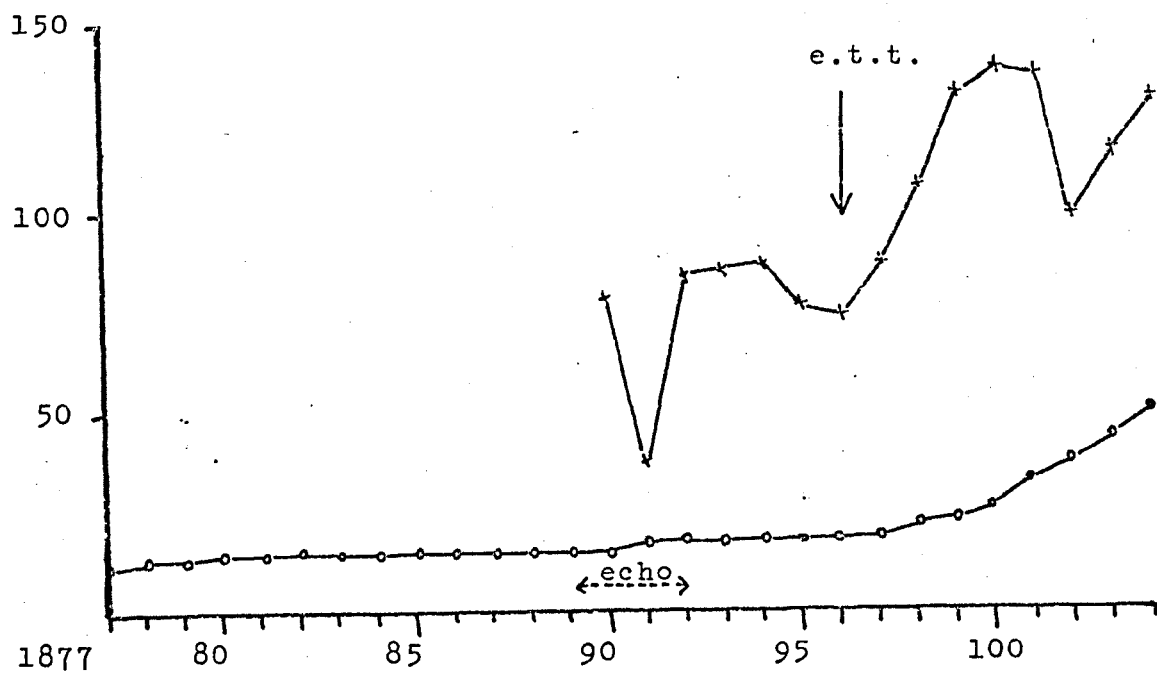


Figure 3.3d. Leeds: Housebuilding and Tramway Construction

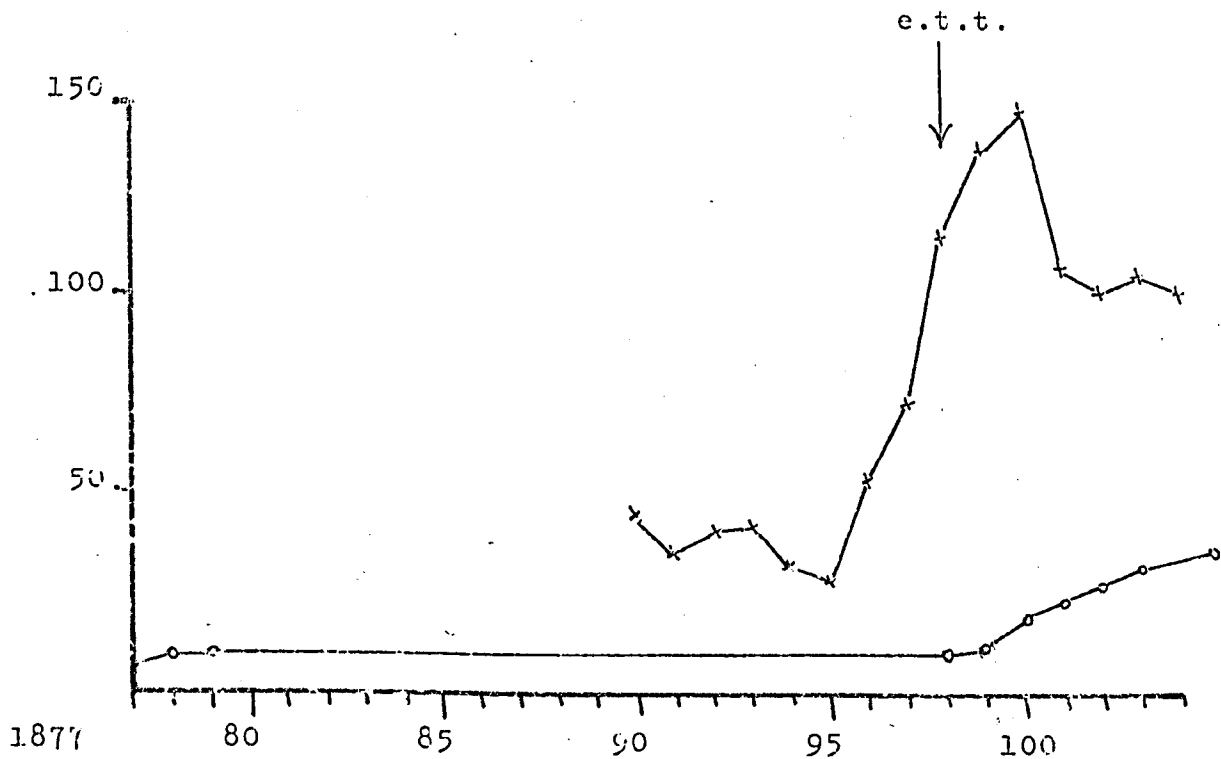


Figure 2.3e. Sheffield: Housebuilding and Tramway Construction

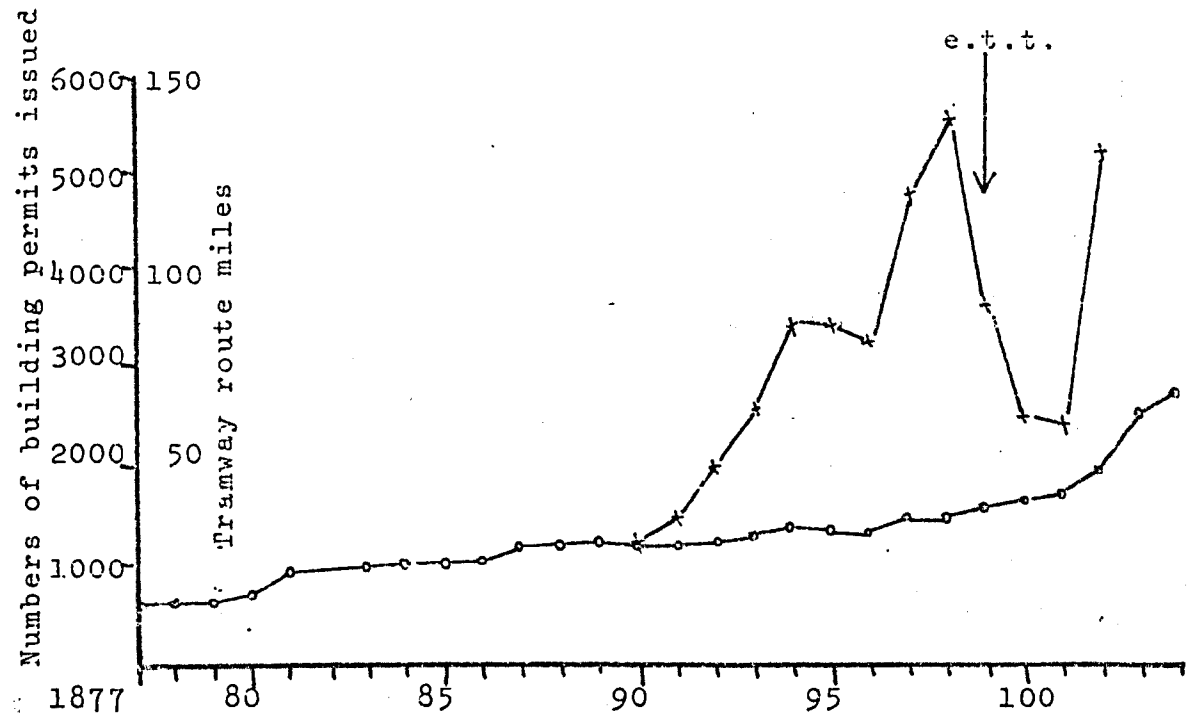


Figure 3.3f Glasgow: Housebuilding and Tramway Construction

Sources: Tramways. Board of Trade Annual Returns on Tramways, etc.
Housebuilding. Figures 3.3 a-e - S.B. Saul Housebuilding in England 1890-1914. Economic History Review 1962/63 Volume 15 pp 120-121.
 Figure 3.3f - Glasgow Municipal Commission on the Housing of the Poor 1904. p.81

Chapter Four.

The Bus Threat. 1919-1939.

Until at least the end of the 1914-18 War horses were a major component of any war effort, and so it is not surprising to find that significant changes in inland transportation techniques took place during times of national confrontation. Military requisitioning raised the demands for horses and fodder which in turn increased their costs and encouraged their replacement in civilian operations. The Napoleonic Wars gave rise to the railway locomotive;¹ the Crimean and Franco-Prussian Wars produced the tramcar; and the Boer War had the dual effect of enhancing the economics of horse replacement by electrification in the tramway industry, and of forcing the surviving omnibus business to look elsewhere for motive power. Since tramways had been banned from the centre of London in 1869 because of contemporary traffic congestion, the London omnibus had continued to flourish long after provincial operators had closed down. However, this meant that the Boer War hit the London omnibus business hard, and the costs of requisitioning had to be overcome by some novel solution, one offering the necessary flexibility of movement in narrow streets and holding out the promise of lower working expenses or independence from the horse.

¹ Steam engines were used for traction at the Middleton Colliery near Leeds in 1812. See H Pollins Britain's Railways 1971 p 20.

The first successful petrol omnibus venture started in London in 1899¹, and the Tilling's petrol bus services of 1904 saw the business finally move away from animal traction. In 1904 there were 31 petrol buses in London, there were 241 in the following year, and 2908 in 1912.² In 1916, estimates derived in the Statistical Appendix, Section 1 show that the number of petrol buses in Britain was around 3,000 which highlights the fact that in Edwardian Britain the motor bus was very much a creature of its own haven in London. The bus's heavy expenditure on tyre renewals and engine maintenance, combined with relatively low loading capacity, resulted in unattractive cash flows unless traffic demands were low, in which case the opportunity costs of tramway operation were very high, or where operation was subjected to extraneous legal or physical restraints, as in inner London. An estimate of petrol omnibus working expenses made in 1905 put them at 8.69d per mile run,³ and another put the total costs at 10.2d.

¹ The Motor Traction Co. was operating a 26-seater 12-hp bus from 9 October 1899 see J R Day The Story of the London Bus 1973 p 41. The first licenced public motor service in Britain started in Edinburgh 9.5.1899. See D L G Hunter Scottish Buses before 1928 1973 p.1.

² R Fulford Five Decades of British Electric Traction 1946 p.60

³ W W Beaumont Oxford Tramway and Omnibus (Supplementary Report) to Oxford City Council 16.8.1905. City of Oxford Special Minute Book 1900-06 (GG4.1) p 263.

per mile run.¹ In both cases tyre wear accounted for 2d/bus mile run or more, and power costs took up another 1d to 1.5d, but maintenance and repairs proved to be a stumbling block: these costs were not yet known and in some instances the use of motor buses was "being discontinued on account of the cost and the time out of service involved in repairs."² The figure of 10.2d/bm for total costs must be regarded as an optimistic estimate (the figure was put at 12.07d in 1908)³ and this has to be compared with the 'model' total charge for electric tramway operation of around 10d/cm. The term 'model' charge is used because as we saw above few companies or local authorities were putting aside enough on their capital account, and so, in fact, the actual figure would bring the bus-tram comparison further in favour of tramway operation. Nevertheless, if in the extreme case petrol bus and electric tram expenses were similar, their revenue earning capacity at equal fares was not. The tramcar had a capacity of around seventy passengers whereas the largest buses were carrying only thirty-four. By 1908 towns like Manchester and Dundee were looking to the trolley bus because the petrol bus had

¹ W A Luntley Motor Omnibus versus Electric Tramcars
LRTJ 14.7.1905 Vol 13 p 49.

² S Sellom Further Report on Oxford Tramway and Bus
Operation 17.8.1905. City of Oxford Special Minute Book op
cit p 261.

³ Wolverhampton Corporation estimates in LRTJ 3.7.1908
Vol 19 p 4.

been "tried and found to be an almost universal failure from an economic point of view".¹ Outwith London the pre-World War One petrol omnibus had only a limited role to play by providing transport facilities for low demand routes where their lower capacity was no drawback and their small capital commitment a distinct advantage. By 1916 motor buses were being used as feeders to the central tramway networks of such towns as Sheffield, Manchester, Leeds, Walsall and Birmingham, and only in Oxford and Eastbourne were public transport systems wholly operated by buses.² At this time it was certain that unless technical improvements could raise bus efficiency and loading capacity, or unless some urban policy decisions altered commuting habits and service densities, then the bus would have to be content with playing second fiddle to the tramcar as the prime mover of urban dwellers.

Nonetheless, 1916 was the middle of the First World War, during which it has been noted that "in many directions the effect of war was to accelerate rather than to innovate development - aircraft and the motor lorry provide the outstanding example."³ As in previous confrontations, the 1914-18 War

¹ LRTJ 4.9.1908 Vol 19 p 143.

² Report upon the Tramway Systems of the City of Edinburgh Edinburgh Town Council Report October 1916 p 17.

³ R S Sayers The Springs of Technological Progress in Britain 1919-1939 Economic Journal 1950 p 278.

machine requisitioned the motive power of the omnibus. Unlike the electric tramcar, what could pull an omnibus could equally well pull a gun-carriage or transport troops. But this time the omnibus business was compensated for the disruption of its operations. Europe proved to be an excellent test-bed for these early commercial motors, and in 1919 the industry was handed back a much improved machine plus a vast number of demobilised men experienced in its running and maintenance. In the 1920's the omnibus industry reverted to its 1850's structure with many ex-soldiers buying one or two buses and running inter- and intra-town services.¹ In 1933, 82.6% of all bus operators had less than five vehicles, and 92.9% had less than ten² (the latter's vehicles accounted for 62% of all buses in that year). These operators were not providing any comprehensive public transport service, but rather, they were skimming off the cream from the major travel links by running low frequency services and not attempting either to cope with peak demands or run socially necessary off-peak schedules.

It was this aspect of the competition which worried tramway men, because, if the 1914-18 War had strengthened the hand of the omnibus, it had undermined the technical superiority of the tramcar in the 1920's, and it had altered the economics of public transport by drastically changing its basic demand structure.

¹ J Hibbs A History of British Bus Services 1968 p 70

² D N Chester Public Control of Road Passenger Transport 1936 p 49

During the war, cost increases and the lack of materials meant that permanent way renewals, which were in fact reaching their renewal cycle peak, had to be forgone.¹ In 1919 renewal programmes were hampered by material price increases in the order of 150 to 200% over 1914 price levels, and wages had risen over the same period by an average of 60 to 100%.² These price increases pushed many tramway undertakings to their legal fare ceilings which had been set in effect in 1870, and the Government gave the industry a temporary respite in 1918. But such fare increase provisions were insignificant; low pre-war depreciation allowances and high post-war cost inflation pushed many undertakings into the red. By 1920 the manager of Edinburgh Corporation Tramways estimated that the cost of track renewal had escalated from £12,000 per double mile in 1914 to £40,000.³ In this inflationary nightmare the industry concentrated on lowering its working expenses through devising more efficient track maintenance procedures and trying to relieve itself of the compulsory payments for road upkeep which were literally paving the way for its rival.

¹ Electric Railway and Tramway Journal (ERTJ) 5.11.1915 Vol 33 p 238. ibid 5.3.1920 Vol 42 p 185. See also Select Committee on Tramways (Statutory Requirements) PP 1918 Vol 1V Q 51.

² Report of the SC on Tramways 1918 op cit.

³ ERTJ Vol 43 p 138.

Working expenses rose from 6.5d per car mile run in 1912 to 13.29d in 1918, and reached their peak of 19.72d in 1920. They fell slowly after that and were below the 1918 level by 1927 (see Figure 4.1). But although the inflation in variable costs could be countered to some degree by fare increases, capital expenses had no compensations. Line extensions looked extremely expensive when compared to trackless trolley and bus commitment... but of even more importance for the survival of the tramcar "where tramcar tracks require reconstruction the question as to whether motor or trolley buses should be substituted for tramways is a question which must of necessity in many instances be considered."¹

Throughout the 1920's many of the smaller undertakings abandoned their track in favour of trolley buses or buses as their tramway capital wore out. Such operations had been unsound from the outset when the absence of realistic depreciation considerations had made a lower frequency of service appear economic but such service levels could be satisfied now in a financially viable way by the petrol bus. The total number of tramway undertakings fell from 274 in 1918 to 204 in 1930. The larger undertakings survived and by 1925 their management was bouyant enough to carry out renewals and even extensions with the result that

¹ J M McElroy Some Phases of Tramway Developments in the Past and the Outlook ERTJ 14.10.1921 Vol 45 p 232.

total tramway mileage dropped only slowly in the 1920's from 2576 in 1920 to 2163 in 1930. Many miles of overhead work were utilised by the trolley bus which served the dual purpose of using existing assets and dispensing with track costs and road repair commitments. Route mileage of trackless trolley operation rose from 43 in 1918 to 193 in 1930, and reached 643 by 1937.¹

The final effect of the First World War on the urban transport industry, and probably the most important, was the highlighting of urban housing shortage and slum conditions. The 'Homes for Heroes' ideal resulted in the growth of municipal housing estates and placed great strains on the transport network. These satellite suburbs were built some miles from the city centres and exhibited very marked rush-hour demand patterns - most trips in the morning went one way, most trips in the evening went the other way. The question of demand density was being distorted and tramway extensions to these areas were difficult to justify since track would appear to be under-utilised for most of the day and average revenue earnings might not cover total charges. Conversely, the lower charges per vehicle of bus operation were accompanied by an inability to provide the capacity demanded at the peak hours. In the majority of towns the cheaper solution was accepted, and in 1926 the municipalities introduced their

¹ Ministry of Transport Trackless Trolley Returns 1918-1937.

Omnibus Bill into Parliament as a means to cheapen and facilitate their procedures for gaining powers to run buses now that new housing scheme transit demands were becoming acute.¹ The Bill was thrown out because it was viewed as an extension to municipal trading and as a monopolistic defense action, and nothing more was done until the 1930 Transport Act. This does not mean that the local authorities did not run buses; by 1930 they had 5,000 vehicles, but the important thing is not the ownership of the buses, but that their number was increasing.

As the interwar years progressed, increasingly buses ran in from the council estates and competed with tramcars on their way into town.² "Buses and trams running on the same route may mean that both will be running at a loss, whereas with only one system either would probably run at a profit."³ As a result of the new council house estates new buses were competing directly with old, worn-

¹ Hansard 12.3.1926 5th series Vol 192 cols 2783-2866.

² R S Pilcher Road Passenger Transport 1937 p 53.

A G Pool A Survey of Transport in Sheffield 1933 p 29/30.

³ Pilcher op cit p 111. See also Glasgow tramway managers' report on Rolling Stock Glasgow Town Council Minutes 10.10.1928.

out tramcars,¹ and in the economic climate of the interwar years a policy of gradual substitution of buses for trams appeared quite desirable. By the 1930's the whole replacement issue came to a head. The thirty year life cycle of stock and track was demanding massive renewals, and in the early 1930's the development of the diesel engine was complete. Researched in Germany in the previous decade with the aim of limiting fuel imports, Mercedes-Benz brought the diesel engine to Britain at the end of 1928.² In comparison with petrol engines, savings in fuel and lubricating oil were in the order of 75%, although it must be added that fiscal as well as technological factors produced the costs differences.³ Nevertheless, by 1935 the total cost per bus mile of a diesel 56-seat bus was 13.254d, of which 10.754d comprised operating expenses.⁴ By 1936, 8,547 of the nation's bus fleet were diesel powered.⁵

¹ In 1927 Leeds Corporation were running sixty buses, mainly to their new housing schemes. LRTJ 21.10.1927 Vol 59 p 276.

² G M Junner The Oil Engine and its Influence on Road, Rail and Air Transport Journal of the Royal Society of Arts 24.7.1936 Vol 84 p 929.

³ A E L Chorlton Oil Engine Traction Journal of the Royal Society of Arts Vol 80 p 943, 12.8.1932. By 1928 the tax on petrol was 8d per gallon. There was no tax on diesel until 1933 when a 1d per gallon was levied, and this was raised to 8d per gallon in 1935.

⁴ Pilcher op cit p 149.

The British tramway network declined in the 1930's as total route mileage fell from 2163 in 1930 to 1183 in 1937. The omnibus had won the struggle, but had it won fairly on its own economic merits, or were other forces working in its favour? In this instance any considerations of the bus-tram replacement issue must take into account not only the usual costs of capital replacement and working expenses, but also the modes' relative abilities to cope with the sharply peaked demand curve. And this last factor turns out to be the crucial one; the effect of working class housing estate demand requirements, whether by bus or tramcar, was such that between 09.30 and 16.30 an average undertaking had 70% of its fleet standing idle.¹ This was the position in 1932, and the percentage had risen to 75% by 1938. The industry needed a high capacity, low capital cost vehicle so that the capital investment wasteage of the slack times was at a minimum through achieving the lowest capital commitment per passenger carried ratio. With the grossly unbalanced daily passenger demand function, the goal of public transport shifted from that of simply trying to maintain acceptable service frequencies throughout the day, and now aimed at moving vast numbers of people within very limited time periods. Within this demand framework the numbers of vehicles in a fleet is not the important determinant of service, but rather, it is

¹ A C Baker Birmingham Corporation Tramways General Manager. Peak Loads and Staggered Hours Passenger Transport Journal 24.6.1938 Vol 78 p 314.

the total seating and standing capacity the fleet can provide in toto at a given time. Appendix 4.1 discusses this replacement issue in detail, and it is gratifying to record that in 1933 Henry Watson, in his excellent book "Street Traffic Flow" comes to the same conclusion as our analysis when his method of comparison of the two modes came out in favour of the tramcar for operation on routes with a minimum service frequency of fifteen vehicles per hour. Watson, then goes on to show that for a strictly unbiased comparison several tramway expenses should be ignored. If contributions towards rates and road upkeep are abstracted, then the minimum service frequency rises to only ten vehicles per hour.¹

In broad terms the bus and the tramcar had complementary roles to play depending on the size of the transit system and the nature of the routes under consideration.² But such a compromising attitude was not to be. In the 1930's the tramcar was scrapped: many councils were won over by the lower initial costs of the bus and its cheaper working expenses per vehicle, and this was the case even in a period of cheap money when borrowing for tramway renewals and extensions would have been cheap and easy.

¹ H Watson Street Traffic Flow 1933 p 348.

² See C A Hopkins Passenger Transport Policy Journal of the Institute of Transport (JIT) June 1934 Vol 15 no 8 passim pp 370-375.

People like Watson and Fenelon¹ showed conclusively at the time that in the long run the tramcar was the more efficient vehicle, but still the tramcar lost ground over its rival. Even scrapping the tramcar was an expensive business since it cost £2,000 per route mile to dig up the track and resurface the roadway.

Although the analyses put forward and cited above are proof enough of the bus's inefficiency, perhaps the most striking piece of evidence to support our argument is that in the 1930's the average fare per buspassenger was 2.34d and for the tram passenger, 1.35d. This higher fare did not mean that the bus passenger was travelling on average 73% further than the tram passenger but what it did mean was that the omnibus passenger was paying a higher fare than need be so that the tramcar might be killed. Since such a strategy would hardly be supported by the bus passengers the forces to scrap the tram must have emanated from elsewhere. Obviously the economic considerations of public transport were being smothered by other, non-economic pressures, and by pressures from outwith the public transport using section of the community.

From 1929 public transport in general and tramways in particular declined in the urban political order of things. The main concentration of tramway closures over the years

¹ K G Fenelon The Economics of Road Transport 1925.

1929 to 1932 cannot be criticised. These smaller systems had dubious grounds for operating tramways in the first instance, and in addition, during the interwar years smaller towns did not experience suburban housebuilding to the extent that a centrifugal commuting problem became critical.¹ In this operational set-up working expenses were more important than the capacity and under-utilisation factors discussed in Appendix 4.1. In the larger towns and cities suburban house building resulted in massive movements of people in the mornings and evenings and the majority of this daily transit was carried by public transport, both tramcar and bus. Nevertheless, throughout the interwar period, and in the 1930's especially, more and more people were able to commute by motor car. In 1918 there were almost 78,000 cars on the roads of Britain; by 1930 the figure was just over one million and it reached two million in 1939.² The inflexibility of tramway locomotion was intolerable to this fast growing section of motorists, and from the 1920's pressure was applied to have the tramcar removed from the streets. Official condemnation of the tramcar came in the 1930 Royal Commission on Transport, which had a built-in bias against public

¹ M Bowley Some Regional Aspects of the Building Boom 1924-36. Review of Economic Studies Vol V 1937/38 p 184.

² W Plowden The Motor Car and Politics 1896-1970 1971 App. B p 222.

transport,¹ partly because it was the result of the previous years' lobbying by motoring interests to have their own position clarified. In complete contrast to the findings of the 1913 Select Committee on Motor Traffic which admitted that the motor bus was causing many accidents,² the later Commission's conclusion that tramways were "if not an obsolete form of transport, are at all events in a state of obsolescence, and cause much unnecessary congestion and considerable danger to the public,"³ was quite unfair although not really unexpected.⁴ Even its own statistics introduced doubts into the final report, and the excuse that tramways were dangerous was soon dropped quietly by succeeding Ministers of Transport. From estimates in Appendix 4.2.1 the total number of people carried by bus, tramcar, trolley-bus, car and motor-cycle for urban journeys in 1928 was 8,971 million, of which trams and trolley buses carried

¹ Not one of the twelve man Commission was connected with tramway operation. See G R Steer Tramway Operation JIT November 1932 Vol 14 no 1 p 37.

² Select Committee on Motor Traffic P.P. 1913 Vol Vill and 1X. Report Paragraph 27.

³ Royal Commission on Transport 1931. PP 1930/31 Vol Vill Report Chapter V Para 372.

⁴ In the period considered by the Commission tramway patronage had remained stable and in recent years 18 local authorities had spent nearly £7 million on their tramway systems. See Observations on the Royal Commission on Transport PP 1931/32 Vol XX p 56.

4,722 million. In the same year fatal road accidents amounted to 5,978, 111 being attributed to trams and trolley buses.¹ There were 141,604 non-fatal accidents and 5,907 of these were caused by the public transport modes. These two vehicles carried 52% of all urban passengers yet caused less than 2% of the fatal accidents and 4% of the non-fatal ones. This hardly merits their being branded as public enemy number one.

The Commission had been too interested in the concepts of traffic flexibility; it had consciously or sub-consciously accepted the private motor car as the prime user of the road and this in turn meant favouring the ubiquitous motor bus which could weave in and out of traffic in a manner similar to the car. "Had the Commission been less concerned with popular opinions, the transport policies of small towns, and visionary ideas of the future, but given proper weight to technical evidence, they would not have committed themselves to such foolish, and indeed, ludicrous statements."²

¹ Royal Commission on Transport, First Report Cmd 3365
July 1929 App A

² Watson op cit p 368. If the Commission's thoughts on safety were shown to be wrong, Watson demonstrated that vehicle for vehicle their concepts of traffic congestion caused by tramcars was also mistaken; see pp 317-322. More recently K Leibbrand in Transportation and Town Planning 1970 also concluded that "traffic congestion cannot be overcome by substituting buses for tram lines." p 199.

Throughout the 1930's Ministry of Transport policy was set firmly against the tramcar¹ and in this political forcefield the trolley bus flourished. Trolley bus route mileage rose from 193 to 643 miles over the period 1930 to 1937. Its success stemmed from its ability to compromise the aims of traffic flexibility and domestic power consumption. This latter consideration alone demonstrates the car-owning population's somewhat hysterical antipathy towards the tramcar. In the 1930's - the era of economic nationalism and self-sufficiency - this section decided to promote the motor bus, a vehicle running on imported rubber, albeit from the Commonwealth, and imported fuel which could have been provided by a depressed coal mining industry had electric traction been pursued with similar vigour. As the '30's wore on such facts gained more significance, but they were then used to boost the case of the trolley bus, not the more efficient tramcar. Arguments put forward that the scrapping of one tramcar resulted in a drop in the demand for coal and threw a miner on the dole for forty days² were given scant attention. Such facts were appreciated, but they were so too late for the tramcar.

¹ Hansard 11.11.1936 Vol 316 c 862 ibid 23.2.1938 Vol 332 c 350.

² What about your Trams? Coal Utilisation Board and the British Electrical Development Association May 1936

The gradual policy of tramway closures to ease traffic flow was gaining the upper hand. The entire question of traffic management had been distorted into one of comparing road space per vehicle unit rather than road space per passenger unit.¹ As in the 1860's when those in power saw their carriages hindered by the horse tramcar and had it done away with, so in the 1930's the broadly based Parliament and town council were composed again of private vehicle owners who were to "look at the matter exclusively from the point of view of the motorist, whose theory is that whatever may happen to other people he must not have his speed checked or be inconvenienced in the slightest degree."² This philosophy came increasingly to the fore as the '30's witnessed the spectacular rise in car ownership; it generated not so much an outright assault on the tramcar as fostering the tacit assumptions that route extensions be made by buses, and line renewals be changed to bus replacements. In this way the most economic form of public transport was slowly removed, and the industry changed its goal to the more restricted one of carrying the masses in a way least offensive to the well-off minority.

If the car upset the basis of the supply side of public

¹ TRW 12.3.1931 See article by J Arnott Vol LXIX p 85.

² LRTJ 13.8.1926 Vol 55 p 88.

transport, it also changed some important factors on the demand side. The 1930's was a decade of booming private house building in Britain when the middle classes used their cars to escape into greener and remoter suburbs. Such people were deserting what were the suburbs of 1900-1914 and had provided a major source of revenue for the tramcar. Their exodus not only brought more cars into the rush hour traffic flows, but deprived the tramcar of a staple demand.

In this way the tramways were starved of revenue as the middle classes moved beyond termini, as the working classes were forced to use buses, and as the motorists fought to remove tramlines from busy central areas. The picture comes clearer when we look into the statistics of the period. Throughout the following account many of the figures are ballpark estimates and so we can look for only rough equivalents to support the contention that the death of the tramcar was a symptom of the declining status of public transport as the industry altered to satisfy the will of a motoring minority who gave little consideration to the economic and social issues involved.

In the proceeding analysis paucity of statistical data both demands and allows heroic and sweeping assumptions. There are no official bus patronage figures before 1931 but estimates have been made in the Statistical Appendix Section 2. The analysis is based on two assumptions:

- a. in the interwar period the preponderance of suburban building means that housing and transport functions are closely linked.¹ Commuting comprised the main demand for transit, with obvious factors like economic conditions and leisure use introducing secondary influences.
- b. the people who bought cars were the same people as those who bought new houses.

Over the period 1918-1937 the number of passenger trips made on urban road public transport rose from 5,000 millions to just over 10,000 millions. Figure 4.1 shows this growth in relation to the housing stock, and there is a general correlation between the series until 1931 when the journeys per household begins to decline. The number of trips per household per annum is around 777, and fortunately this can be substantiated by the findings of other contemporary sources. (see Note 1 p 141) If we introduce this trip making function to car and motor cycle ownership statistics, an estimate of private passenger transport useage can be constructed, which, when superimposed on the public transport index, sets the total

¹ Between 1918 and 1931 96% of the housebuilding in Merseyside was suburban; see D. C Jones The Social Survey of Merseyside 1934 Vol 1 p 262. Between 1921 and 1938 the central and middle ring areas of Birmingham lost 22.5% and 24.1% of their respective populations whilst the outer ring gained by 90.9%: see Bournville Village Trust When

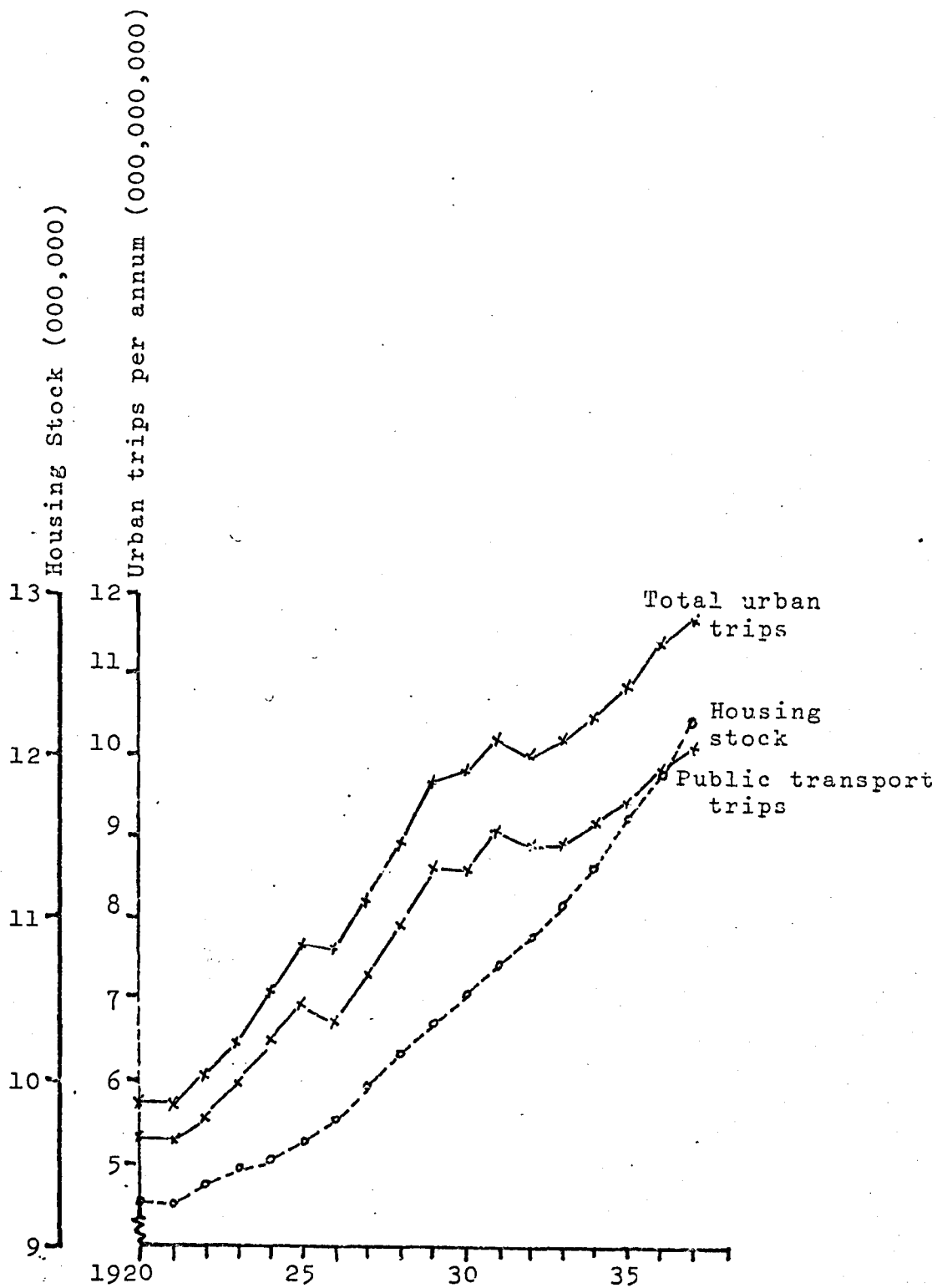


Figure 4.1. Urban Trips and the Housing Stock 1920-1938.

Source: See Tables 4.2.1 and 4.2.3

passenger trip making index back onto its original course. The problem is to dissect this general trend into its bus/tram/car components on the one side, and council and private housebuilding transit demands on the other. From assumption (b) annual increases in car ownership can be subtracted from annual housebuilding statistics for the private sector, and the residue represents a series of annual data of private houses built which were dependent on public transport. This last index is added to the council housebuilding figures to provide a public transport dependent housing index from which trip demand estimates can be projected (see Appendix 4.2.2.).

In the 1920's bus services took the vast majority of the demand and public transport as a whole coped well with the problems (see Figure 4.2). In the 1930's public transport demands fell away markedly, and several factors account for this. Unlike the earlier decade over half the 'public transport dependent houses' were built privately. Such building was able to situate itself on the more expensive land bordering existing roads where transit links were already, either in the form of municipal or rural bus services or in the form of tramways built

cont. We Build Again 1941 p 43. In general, see H W Richardson and D H Aldcroft Building in the British Economy Between the Wars 1968 pp 300-302.

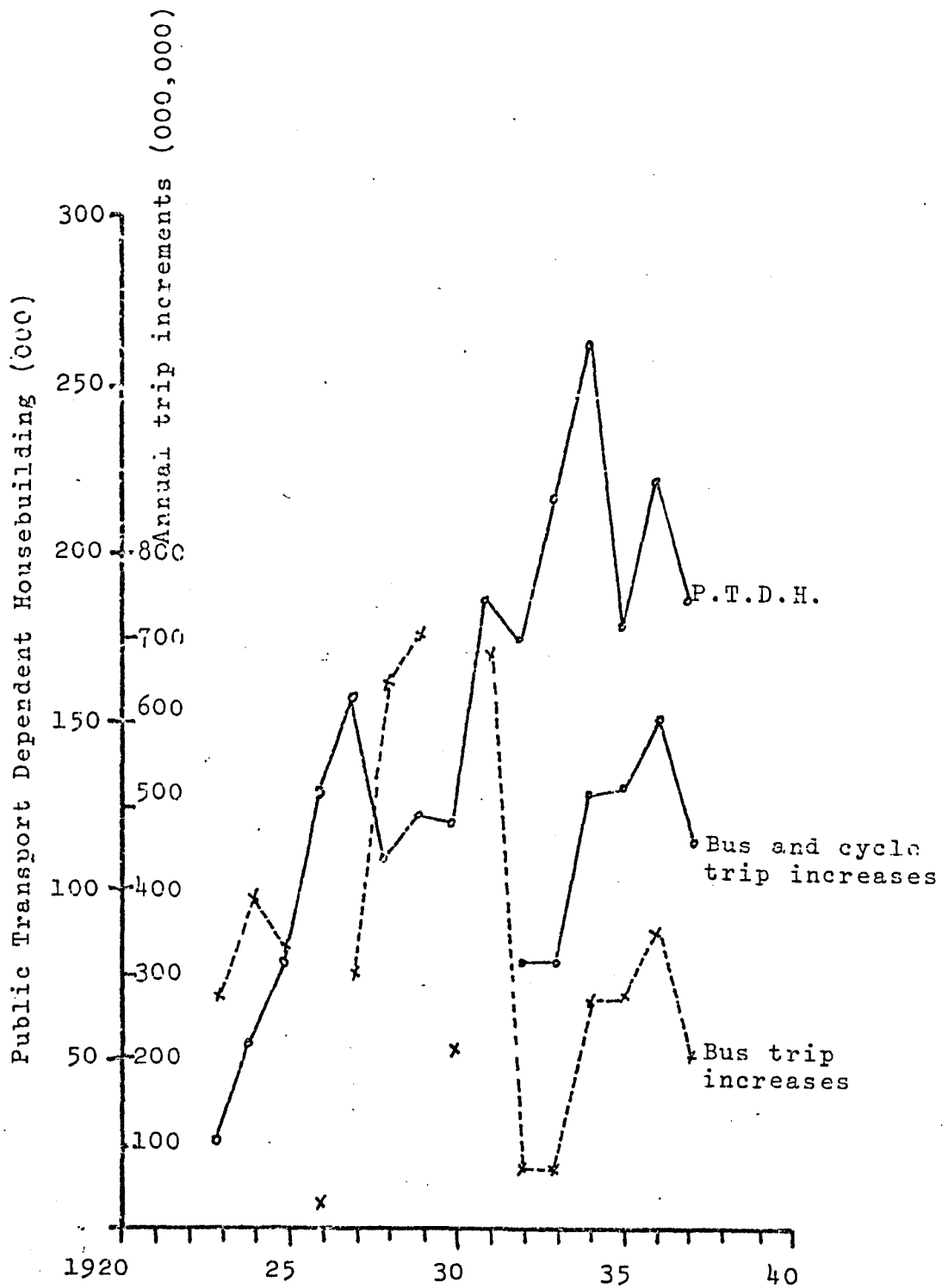


Figure 4.2 Bus Patronage Changes and Housebuilding

Sources: Derived from Tables 4.2.1 and 4.2.2

perhaps in the over-extension phase of the early 1900's. These links allowed private piecemeal speculation to carry on unconcerned with problems of communication with the centre. In many instances the prior erection of overhead wire or tramlines encouraged private building with their implicit guarantee of continuing public transport services;¹ needless to say, this refers more to the earlier years of the period. Conversely, council housing schemes were huge greensite projects well able to carry the costs of totally new social overhead capital in the form of sewers, roads and streets, yet cost consciousness dictated that they be built on the more isolated areas where land values were cheapest.² The switch in importance between private and public building in the two decades meant that in the 1920's housebuilding brought into being a whole new demand, whereas the building of the 1930's merely redistributed the existing demand by forcing the new suburbanites to make longer trips rather than new trips.

Another factor influencing the decline of transport demands in the '30's was that much of the council housing

¹ Fenelon op cit p 97.

² G A Lee The Tramways of Kingston-upon-Hull University of Sheffield PhD thesis 1967/68 p 235. See also case studies, and G E Cherry Urban Change and Planning 1972 p 134.

of that decade was aimed at relieving the conditions of slum dwellers. The people moved into the outskirts were unwilling and financially unable to pay the price of public transport. They offered "erratic or non-existent"¹ traffic demands, and they could "ill afford any increase in transport charges"² which were being foisted upon them. Although the position varied from town to town, one fact remains outstanding; the rent of central slum property was lower than that on the council estates, and the extra burdens of transport costs and higher prices for everyday essentials made suburban living too expensive for such families. An estimate made in the early 1930's put the extra cost of living on a council estate at 10/- per week with the transport fares accounting for 2/- per week per worker.³ The Housing Act of 1935 grudgingly accepted the fact that the poorest could not afford the 'luxury' of suburban living and the subsequent encouragement of central redevelopment was seen as a failure to achieve the Tudors-Walter ideal.⁴ What this

¹ W Vane Morland Slum Clearance Transport Problems
Electric Railway, Bus and Tram Journal 29.6.1934 Vol 70
passim pp 317-320.

² A C Baker Passenger Transport Journal 16.7.1937 Vol 77 p 20.

³ D C Jones op cit, p 283. For a more general discussion
see G D H and M I Cole The Condition of Britain 1937

⁴ Liepmann op cit p 97.

amounted to for the public transport industry of the 1930's was that council housing did not produce the commensurate rise in transit requirements because either the new tenants could not afford the fares, or because in the later years, central rehousing allowed such people to remain outwith the transit nexus.

Another result of the relatively high transport costs imposed on suburban dwellers was the increased use of the bicycle;¹ perhaps as much as 30% of all urban passenger trips were performed by this mode.² Estimates of the number of bicycles vary from six millions in 1929 to ten millions in 1935;³ whilst another commentator states the figure at between four and eight millions in 1937.⁴ Census of Production data for 1924 and 1930 put the annual output of bicycles at over 500,000 per annum and such a growth correlated with the former estimates. If then, bicycle trips were inserted into the passenger index the function begins to approach the 1920's range once more.

A final cause of the decline in trips per household ratio was the growth of home entertainments. Radio

¹ See R Jevons and J Madge Housing Estates - Bristol 1946 p 37. They found that only 14% of the population on the estates could walk to work p 35.

² Liepmann op cit statistical section

³ Pilcher op cit p 295.

⁴ Liepmann op cit p 37.

licences numbered 595,000 in 1923, three millions in 1929, and then shot up to nine millions in 1938.¹ Such an expansion persuaded more and more people to stay in more often than they might have otherwise, and it may well be that this home-based attraction more than outweighed the trip making past-times of the cinema and dance-halls.

In general, the omnibus catered for the demands of the non-car-owning suburban dweller. In the 1930's the position was blurred by central rehousing, inability to pay fares, bicycle use, and the rise of home entertainment.

For the tramcar the story is not so happy. Throughout the 1920's, regardless of system closures, expansion in the larger systems meant that tramways held their own: 4,670 millions trips were made on the tramways in 1920, and 4,613 millions in 1929. This maintenance of demand despite the bus-orientated council house building strengthens the thesis that tramways were a middle class institution which would be allowed to decay only when the middle class had no further use of it.

On a regional basis, the problem is shown again to be one of class conflict. Most of the private housebuilding, especially in the 1920's, was in the South-East, and it

¹ A Briggs History of Broadcasting in the United Kingdom

Vol 1 1961 p 18, Vol 2 1965 p 450.

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was there that tramway closures were widespread. In the North lack of private building prevented the tramcar from losing its staple demand, and so systems could renew and consolidate in the '20's and increased their resilience to pressure when private housebuilding boomed there in the '30's. It is significant that the systems to close last in this country were nearly all in the northern area; Manchester stopped tramway operation in 1949, Bradford in 1950, Newcastle, Gateshead and Stockport in 1951, Birmingham in 1953, Belfast and Sunderland in 1954, Dundee and Edinburgh in 1956, Liverpool in 1957, Leeds in 1959, Sheffield in 1960 and Glasgow in 1962.

The case study of Scotland tells the story in greater detail. The interwar building cycle was quite different from that of England and Wales. Pre-1918 Scottish housing exhibited two distinct features; working class accomodation was overcrowded and dilapidated,¹ and middle class housing to a large extent was in the form of well-appointed stone tenements.² These characteristics were to have an enormous impact on the development of public transport in interwar Scotland.

¹ Royal Commission on the Housing of the Industrial Population of Scotland Rural and Urban PP 1917/18 Vol XIV Report 4/5

² A Shaw Municipal Government in Great Britain 1895 p 83.

Local authority building played a significant role throughout the whole period and accounted for over 60% of all houses built in contrast to 31% in England and Wales.¹ Such housing strategies threw up a huge new demand for public transport. On the other hand, private building was relatively insignificant. Middle class acceptance of the tenement system meant that new homes in the suburbs offering similar accommodation were relatively more expensive than the equivalent comparison in England. It also meant that Scottish towns were more compact; passenger journeys were shorter, fares were lower, and service frequencies were higher than elsewhere. Within this situation the lure of the private car and the new houses was not strong, regardless of any income disparities between Scotland and England. Indeed, it is noteworthy that in Scotland the annual increment in car registrations was higher than the annual rate of private house construction (it was approximately 50% to 60% for Britain as a whole) and this shows a decided preference for continued tenement living.

This major difference between the housing cycles of Scotland and England and Wales was pinpointed by Bowley in 1945 and it was that "the migration out of old middle-class houses into new ones in the suburbs was relatively

¹ M Bowley Housing and the State 1919-1944 1945 App. 1.

unimportant"¹ in Scotland. By 1937 a country claiming 10.8% of the British population had 8.5% of the cars and only 3.5% of all new interwar private housing. In fact, the ratio of car ownership is really much lower if only the urban areas are considered; although half Scotland's population lived in towns, only one third of her cars were registered in them. In 1937, of the 1.8 million cars in Britain, 136,000 were in Scotland, and only 47,000 in Scottish urban areas.² This figure might well be not far off the national average in terms of cars per capita, but it must be remembered that both cars and roads are physical entities and relative car penetration is not important. Roads can absorb a finite amount of traffic before undue congestion sets in, and what is being put forward here is that Scotland's 47,000 motorists were not promoting the urban traffic crises under which some English cities were labouring.

The combination of low private house building and low car ownership fostered a discussion of public transport developments within which the merits of both tramcar and bus were evaluated without reference to the extraneous constraints imposed by the consideration of motor car compatability.

¹ Bowley op cit p 266.

² Ministry of Transport Returns on Vehicle Licences

An accurate statistical analysis cannot be presented since data is not available, especially with reference to bus passengers in the 1920's. This is due mainly to the waves of private bus operators sweeping daily into Glasgow in that decade. The council estates were linked by such services, but in addition, the density of Edwardian Scottish cities enabled these estates to be nearer town centres, than was possible in England and the decision to extend tramway lines was easier to justify. In Edinburgh tramway mileage rose from 41 in 1927 to 47 by 1938; in Glasgow mileage increased from 99 in 1918 to 138 in 1931 and then fell slightly to 133 by 1938. Route mileage covered by bus operation in Edinburgh was 51 in 1930 and 68 in 1938; for Glasgow the equivalent mileages were 51 and 125. (This high increase reflects the Corporation's defeat of the private operator). In Scotland the bus was used to develop new routes, such as those to the growing housing schemes, but tramway allegiance remained strong. In the 1930's the early years saw the closure of several of the smaller undertakings, but by 1934 tramway patronage was on the up. Sketchy though the statistics are, their conclusion is clear enough. The stability of the Scottish middle class home ensured the continuing patronage of the tramcar. Tramways did not lose this group's allegiance.

to the bus or the motor car and so preserved a powerful pressure group within local politics to advocate its expansion and modernisation. Throughout the twenty years of the period the level of tramway patronage remained constant at around 700 million trips per annum, whereas bus trips increased from only 96 millions in 1930 to 173 millions in 1938. For Britain as a whole the bus overtook the tramcar as the major passenger carrier as early as 1930.

In Scotland public transport decisions were taken on their own merit, and as a result both the tramcar and the bus flourished. The lack of middle class car migration made the job of suggesting tramway renewals easier, not because the economics were that much more attractive than in England, but because it was politically advantageous to do so. In the first four years of its existence the London Passenger Transport Board closed down 152 miles of tramways; in 1938 Glasgow Town Council recommended that "the tramway system be continued in the best condition, and extensions where advisable be constructed."¹ In 1934 English cities were extending bus services to the growing working class suburbs; in Edinburgh the town council decided to extend the Corstorphine tram route in advance

¹ Glasgow Town Council Minutes 7.9.1938.

of planned private house development.¹ The Corporation introduced a "New Standard" class car in the same year,² Glasgow brought out the "Coronation" car in 1938, and Aberdeen was still buying tramcars in 1940.³

Early in the bus-tram struggle, one journalist managed to explain this Scottish divergence from the British trend when he remarked that "the transport problem, it must be remembered, has become acute with the housing problem. The two go hand in hand. The double-deck tramcar may be described as the tenement of the transport system. The bus is the bungalow",⁴ either private or municipal.

In general, the private housing estate killed the tramcar. It not only took away its custom but relied for communication on an incompatible competitor. The crux of the matter was that public transport vehicles were becoming

¹ Edinburgh Town Council Minutes 11.1.1934.

² A G Gunn The Plain Man's Guide to Edinburgh's Trams
Scottish Tramlines March 1967 No. 14 p 14.

³ Passenger Transport Journal 9.8.1940 Vol 83 p 41.

Such expansionary tramway policy goals were not confined to Scotland. In 1944 Leeds tramway manager still maintained the superiority of the tramcar/subway system.

A D Young Leeds Trams, 1939-1959 Modern Tramway February 1973 Vol. 36 p 41-48.

⁴ Glasgow Herald 26.6.1926.

a considerable nuisance to the more powerful sections of national and local communities. The huge unbalanced demands of the council housing schemes had no bearing in the matter: over the interwar period public transport passengers had doubled and rush hour demands had intensified - all factors enhancing the superiority of the tramcar - yet the bus gained steadily over its rival. Few spoke out in favour of the tramcar, and those who did saw the issue in its true colours. This was not a bus-tram controversy; it was a tussle between the needs of public and private transport modes. In the 1930's the industry retired defeated, and as one commentator put it; "many systems which have passed away would still be in existence had as much thought been given to the development of the tramcar as has been given to the trolley bus and motor bus."¹ It would appear that carrying capacity was not thought important, that pollution was not thought important, that technical efficiency was not thought important, - if the diesel engine was so good, why were there no diesel tramcars?² - but traffic movement was considered of

¹ J Steele Street Transport and Electricity JIT June 1939 Vol 20 No 8 p 237.
²

This point was raised as early as 1905 when it was argued that: "Tramways are designed to reduce the tractive effort required to propel vehicles upon a road surface, and consequently to increase the carrying capacity of the highway and reduce the cost of vehicular traffic

prime importance. In 1937, 86% of all urban passenger journeys were made on public transport, yet the true, unbiased, economic and social functions of the service were rarely discussed. The 14% had already made up its mind.

cont. If the petrol 'bus is the economical vehicle suggested, the logical result will be, not the abolition of the tramway, but the advent of the petrol tramcar".

H M Sayers Tramways versus Motor 'Buses The Electrician
Vol L1V p 697.

Note 4.1

In 1937 the average expenditure per household on public transport in Birmingham was £8.17. Report of the Royal Commission on the Distribution of the Industrial Population PP 1939/40 Vol 1V Para 136. The average bus fare was 2.3d which gives a journey per household figure of around 850 per annum.

In Journey to Work 1944, Leipmann constructed the travelling patterns of the employees of 36 companies. Taking those relating to the 1936 patterns of the provincial companies, 30% cycled to work, 30% walked, and 40% used public transport, p 164. The average family in 1937 comprised 1.7 wage earners (Ministry of Labour Gazette December 1940) thus each family had (40% of 1.7) 0.68 public transport users. The Birmingham survey (Leipmann reference 12) stated that approximately 25% of public transport users go home for lunch, thus we can construct a guestimate of the average annual trip making demand per household by the following:

$$\text{Demand} = (75\% \times 0.68 \times 50 \times 2 \times 5) + (25\% \times 0.68 \times 50 \times 4 \times 5)$$

where 50 refers to the working weeks per annum, 2 and 4 refer to the number of trips per day, and 5 refers to the number of working days per week. To this figure of 425, an estimate of leisure use has to be added. Assuming

that the family go out once together at the weekend, then this produces a demand of $3.6 \times 2 \times 1 \times 50$ where 3.6 is the average family size, 2 is the trip there and back, 1 is the day and 50 refers to the numbers of trip making week-ends. If this figure of 360 is added to the work trip, the total family trip making demand lies at 785 trips per annum.

Pool op cit p 26 found the average annual trip rate per capita in Sheffield to be 330 in the early 1930's. Finally, F Pick in the Growth of Cities JIT November 1931 Vol 13 No. 1 p 11 estimated the average annual trip making ratio per person to be between 200 and 300. This results in an average household range of 720 to 1080.

Although all these estimates vary, they are within a narrow enough range to allow the use of our own estimate of 777 with a certain amount of confidence.

Appendix 4.1

The comparative economics of bus and tram operation in the 1930's

The following discussion will look at the economic performance of the tramcar in its worst case and the motor bus in its optimum case. We shall assume that in the 1930's the tramway system of our hypothetical town requires total renewal. Line renewal at £22,000 per double mile,¹ and an estimate for new generating plant of £5,500 per double mile² result in a total capital commitment in the region of £27,500 per double mile of track. Considering that the lifespan of the generating plant was greater than the fifteen years of the track, and also noting that suburban track wore out at a slower rate, a fifteen year write-off period puts the tramway case at its most pessimistic. At a capital cost of 3% per annum this constitutes a capital charge of £2,247 per double mile per annum.

¹ See cost estimates in Edinburgh Town Council Minutes 11.1.1934.

² This figure is based on the track cost/generation plant cost ratio identified in the 1895 Leeds Corporation Report on Tramways op cit.

As for the vehicles themselves, a large tramcar cost £2,500¹ and a diesel bus cost around £2,000. The useful life of the tramcar was twenty years, which discounted at 3% produces a capital charge of £131 per annum per vehicle. The loan repayment period on a bus was eight years and this was a reflection of the vehicle's unknown long term performance. Many operators were writing off their capital over four or five years,² and it was not until 1937 that the expected life of the bus eventually matched the eight year accounting period.³ Nevertheless, let us discount the bus over eight years, which at similar rates results in annual capital charge of £283 per vehicle. However, passenger carrying capacity is the important factor; the largest bus had a capacity of 75 including standees and the largest tramcar had an equivalent capacity of 90.⁴ The capital charge per passenger capability per annum was thus £1.45 for the tram and £3.77 for the bus.

On the issue of low capital commitment per passenger the

¹ See Glasgow Town Council Minutes Tramways General Manager's Report on Fares Revisions 3.7.1928.

² R H Wilkinson The Advantages and Limitation of the Tramcar, Railless Vehicle, and Motor Bus JIT April 1930 Vol 11 No. 6 p 281.

³ Pilcher op cit p 216. See also Motor Transport Bus and Coach Supplement 3.4.1970. The expected life of a bus in the 1920's was 5 to 6 years, and it was only 8 or 9 years in the 1930's.

⁴ Watson op cit p 267.

tramcar wins outright. But this capital saving is the result of the different ways in which the capital expenditures of the two vehicles are distributed. The motor bus provides its own motive power and shows a higher capital charge because the equivalent commitment in tramways includes not only vehicle costs but the much larger fixed investment track and plant. The debate now steers itself to the question, at what density of service does the capital cost of non-vehicle equipment fall below the comparative savings between the tram and the bus on vehicle account? Is this minimum frequency a realistic one?

In the interwar years the average mileage travelled by a tramcar in a year was 28,000¹ and so this provides a capital charge per passenger carrying unit (pcu) of $\text{£}1.45 \div 28.000 = 0.012\text{d}$ per mile. The average annual bus mileage was 25,000,² which gives it the equivalent cost of 0.036 per pcu. The working expenses of tramway operation at the time were 12d per vehicle mile, (0.133d per pcu) and for bus operation, 10.75d (0.143d per pcu). The cost savings in favour of the tramcar on 'vehicle account' were $(0.036\text{d} + 0.143) - (0.012\text{d} + 0.133\text{d})$ per pcu = 0.034d.

The frequency of service capable of reducing the standing charges for non-vehicle tramway investment of £2,247 per annum per double mile is:

$$\frac{2247 \times 240}{0.034 \times 90} \text{ cm/m } 176,000 \text{ car miles per mile.}$$

¹ Ministry of Transport Tramway Returns

This level of tramway service was surpassed in 1930, and assuming a sixteen hour day, is equivalent to a service frequency of one tram every two minutes. It must be remembered that this is an average frequency for the whole system, including the densely used central routes.

The demand function with its grossly distorted profile introduces another cost into the comparison; the capital cost of vehicle underutilisation. As mentioned in Chapter Four, for 75% of the working day 70% of the fleet lay idle. This resulted in an average underutilisation factor of 52.5%. The higher capital charges of the bus are further emphasised by this factor. Assuming an even demand distribution, then the average mileage per vehicle would be $152.5\% \times 28,000$ miles per annum for the tramcar, or 42,700, and 28,125 miles for the bus. This 'normal mileage' would have reduced the capital charges per pcu per mile run to 0.008 for the tram and 0.023 for the bus. The effect of the 'peaky demand state' was to increase the charges of the tramcar by $(0.012 - 0.008d)$ or $0.004d$ per pcu, and of the bus by $0.023d$. The tramcar can claim a capital cost saving of $0.009d$ per pcu on the grounds of less capital wastage in the non-peak periods, and as the peaks become more concentrated this saving would become more pronounced. Including this underutilisation factor into the original calculation reduces the minimum vehicle frequency for tramway operation to 1 vehicle every $2\frac{1}{2}$ minutes.

The analysis presented above has been biased in every way to favour the bus. If, however, the procedure is repeated using actual data the issue is left in no doubt. In the 1930's the average carrying capacity of the bus was 39, and for the tramcar it was 78. Further, if the useful life of a bus is set at the realistic span of five years, the significant increases in capital charges means that the tramcar is the most efficient mode for any route requiring a minimum service frequency in the order of 11 vehicles per hour.

For the large towns the tramcar was the cheaper form of public transport, but it must be stressed that the foregoing analysis does not imply that tramways would have run at a profit. All that has been shown is that in terms of expenses, and assuming identical fares for both tram and bus passengers, then the higher loading capacity for the tramcar and its lower capital commitment per passenger carrying capacity prove to be the deciding factors in the bus-tram debate.¹

¹ "A motor bus fleet can be proportioned to the traffic, it is true, unlike the tramway, but the very fact that this is possible necessitates that the units that are provided be kept fully employed, for they are expensive pieces of capital". Fenelon op cit p 147.

The underlying operational unit of measurement used has been that of the system. Liebbrand¹ claims this to be the only valid approach to public transport assessment, but in the 1920's and 1930's the vehicle replacement decision was taken on a route by route sequence. As a result the overall advantage of the tramcar was gradually whittled away.

¹ Leibbrand op cit p 199.

Appendix 4.2

Interwar transport and housing trends

Table 4.2.1 Estimates of urban road-based passenger trips.

Trips made by						
(000,000's)	T'car	Track-less trolley	Bus	Total Public Trans.	Car	M/C Total trips.
Year						
1918	4558	7	408	4973	60	34 5067
1919	4987	8	512	5507	85	57 5649
1920	4670	11	710	5391	145	144 5680
1921	4256	10	1018	5284	188	186 5658
1922	4349	12	1227	5588	244	189 6021
1923	4443	18	1503	5964	297	215 6476
1924	4620	24	1895	6538	367	248 7154
1925	4669	34	2228	6931	450	286 7667
1926	4460	50	2258	6768	531	318 7617
1927	4706	80	2554	7344	611	340 8295
1928	4623	99	3210	7932	687	356 8975
1929	4613	127	3920	8660	762	365 9787
1930	4394	152	4136	8682	820	362 9864
1931	4108	184	4823	9115	841	313 10269
1932	3845	221	4895	8961	876	300 10137
1933	3778	254	4967	8999	934	281 10214
1934	3665	338	5241	9244	1016	274 10534
1935	3526	445	5524	9495	1147	258 10900
1936	3379	632	5884	9895	1276	253 11424
1937	3058	865	6097	10020	1397	244 11661

Sources: Tramways and Trackless Trolley Returns of the
Ministry of Transport.

Sources cont. Buses - see Statistical Appendix Section 2.

Car - the annual number of cars licenced times 777
see Table 4.2.3

M/C - the annual number of motor cycle licences
times 500 where this is based on the assumption
that a motor cycle provides trip capacity for
an average of one rider of at least ten trips
per week.

Table 4.2.2. Public Transport Dependent Housebuilding
(P.T.D.H) in '000's.

Year	Municipal (a)	Private (b)	Car increase (c)	Private PTDH (d)	Total PTDH (a)+(d)
1920	17				
1921	87				
1922	67				
1923	20	75	69	6	26
1924	24	120	90	30	54
1925	50	135	106	29	79
1926	84	150	104	46	130
1927	120	140	102	38	158
1928	70	138	98	40	110
1929	73	147	96	51	124
1930	61	137	85	62	122
1931	77	138	27	110	187
1932	67	155	44	110	177
1933	70	223	75	148	218
1934	75	293	105	188	263
1935	70	280	169	111	181
1936	87	283	147	136	223
1937	92	268	173	95	187

Sources:

(a) and (b). H W Richardson and D H Aldcroft Building in the Economy between the Wars 1968 p 56.

(c) W Plowden The Motor Car and Politics 1896-1870 Appendix B

(d) (b) - (c).

Table 4.2.3 Estimates of Housebuilding Trip Generation.

Year	Public Transport Trips (000,000's)	Housing Stock (000,000's)	Trips per Household
1920	5391	9.262	582
1921	5284	9.290	568
1922	5588	9.361	597
1923	5964	9.448	631
1924	6538	9.516	687
1925	6931	9.615	721
1926	6768	9.771	692
1927	7344	9.968	737
1928	7932	10.189	778
1929	8660	10.370	834
1930	8682	10.532	824
1931	9115	10.710	851
1932	8961	10.895	822
1933	8999	11.100	810
1934	9244	11.341	815
1935	9495	11.640	815
1936	9895	11.952	827
1937	10020	12.258	817

average 777 trips per
household per annum.

Sources: Trips. see Table 4.2.1

Housing Stock Richardson and Aldcroft op cit p 60

Table 4.2.4 Scottish Housebuilding and Transit Statistics
for the 1930's.

Year	Municipal Housebuilding	Private Building (ass. and unass)	Total	Transit Demands (000,000's)
1930	7918	4186	12104	9.40
1931	8315	3804	12119	9.42
1932	11631	5643	17274	13.42
1933	15808	7787	23595	18.33
1934	15188	9202	24390	18.95
1935	18814	6578	25392	19.73
1936	16044	7328	23372	18.16
1937	13341	7629	20970	16.29

Source: Tenth Annual Report of the Department of Health
for Scotland. PP 1938/39 Vol XI Appendix two.

Transit demand is total housebuilding x 777.

Transport Statistics. Patronage on bus and tram.

Year	Scottish Tramways	Edinburgh Corp.buses	Glasgow Corp. buses	Scottish buses	Total Public Transport
in (000,000's)					
1930	691.7	29.4	48	97	788.7
1931	654.1	31.7	74.1	132	786.1
1932	644.2	34.7	81.6	145	789.2
1933	647.7	36.1	70	133	780.7
1934	665.6	36.9	71	135	800.6
1935	675.5	38.4	73	139	814.5
1936	685.2	42.7	73	145	830.2
1937	694.4	48.1	78	158	852.4

Sources: Tramways - Ministry of Transport Returns op cit

Buses - Corporation reports. These two cities
accounted for approximately 80% of Scotland's tramway
passengers in the '20's. This percentage has been applied to
their bus patronage to produce a national estimate.

Table 4.2.4 cont. Scottish Housebuilding and Transport
Public versus Private Transport.

Year	Total transit requirements 000,000's	Public trans. increases 000,000's	Increase in car regs.	Urban car trip ests. 000,000's
1931	9.40	-2.6	2014	0.52
1932	13.42	3.1	3624	0.94
1933	18.33	-8.5	5626	1.46
1934	18.95	19.9	7297	1.89
1935	19.73	13.9	11526	2.98
1936	18.16	15.7	12314	3.19
1937	16.29	22.2	11226	2.91

The urban trips by car are estimated by taking one third of the annual increment in car registrations and multiplying this by 777.

Case Studies of Edinburgh and Glasgow

The following chapters are in essence company histories, while their effects on the social and geographic fabric of the cities are discussed in Chapter Seven. Maps One and Two are designed in the first instance to elucidate on the growth of the towns, but they may prove useful for the following chapters in as much as areas and streets are mentioned.

Chapter Five

Edinburgh

"The tramways of city of Edinburgh have been constructed under very considerable difficulties, municipal and physical."

D K Clark Tramways; their construction and working. 1878 p 243.

"The avenues to Edinburgh are lined with streets of a highly respectable class, the abodes of poverty being, for the most part, confined to those gigantic piles of building in the older parts of the city..."¹ This spatial description of the Edinburgh of 1851 could apply equally well to most other mid-century British towns, but further reading reveals the Edinburghesque; these piles "so essentially contribute to the picturesque grandeur of the place" although it is added that, as with the Cowgate, "the tourist will, in all probability, have no wish to cultivate a closer acquaintance"² with them. If Edinburgh's visitors had this choice, her residents did not. Central rebuilding was exacerbating working class living congestion and the demolition of cheap central living accomodation was stimulating rent increases to such a degree that in July 1858 a public meeting was held where those affected voiced their disapproval. The outcome of this meeting was a report published in 1860³ which drew attention to the living conditions of the poor in the city. But this was a document called for and produced by the poor themselves, and it was not until November 1861, when a High Street

¹ C Black Guide through Edinburgh 1851 p 4.

² ibid p 76.

³ Report of a Committee of the Working-Classes of Edinburgh on the Present overcrowded and Uncomfortable State of Their Dwelling-Houses. April 1860

tenement collapsed and killed thirty-five people, that middle-class concern was aroused. A Medical Officer of Health was appointed in the following year; he reported on the problem in 1865,¹ and in 1867 the Corporation set up a committee to look into ways of alleviating the identified distress.

A leading figure in this last movement was Dr. Alexander Wood, sanitary reformer, educationalist, Liberal police commissioner, and chairman of the Association for Improving the Condition of the Poor. Wood himself dispelled the notion that this concern for the Unfortunate was bred out of philanthropy or Christian brotherhood. Rather, the interest shown in the 1860's was a response to the realisation that the town had reached some housing frontier and that central demolition was not only aggravating bad housing conditions, but was also forcing the poor out of their dwelling areas into streets further from the city centre and so closer to the middle class residential districts. The extremes of poverty and comfort could not coexist in close proximity. Wood warned his fellow city leaders that "wide as is the gulf that is placed between your palatial abodes and the dreary dens we have described, the dwellers in the latter can see across it".² It was

¹ H D Littlejohn Report on the Sanitary Conditions of Edinburgh 1865.

² Report on the Conditions of the Poorer Classes. This report has not been traced but it is quoted at length by

all too obvious that if any social conflict were to arise, the middle classes had everything to lose and nothing to gain. "Have not the lessons of Providence and the teachings of history made so little impression upon us, that we have yet to learn that we cannot leave our brothers to sink unheeded in the sea of profligacy, suffering or crime, without running the risk either of being dragged down by them into the vortex, or of being swept away by the waves of lawlessness which their abject condition ever and anon causes to arise?"¹

By the later 1870's such fears were forgotten: either soothing oils had been poured on the "waves of lawlessness" or dykes had been raised against them. Parliamentary enquiries of 1885 and 1917² found Edinburgh's working class houses to be still deplorably overcrowded and unhealthy, and the 1867 Improvement Act, designed to relieve the pressure, reflected the changed attitude of the 1870's by displacing 14,000 people³ in that decade from a central

cont. T Brown in his biography Alexander Wood 1886 pp 148-151

¹ ibid p 151

² Select Committee on the Housing of the Working Classes (11) Scotland. PP 1884/85

Vol 31 Q 18939-19058. Royal Commission on the Housing of the Industrial Population of Scotland, Rural and Urban. PP 1917/18 Vol 14 Report p 103.

³ Select Committee on the Housing of the Working Classes in Scotland PP 1884/84 ibid Q 18711.

site and rebuilding it as Chamber Street to house grand institutions in magnificent buildings. The middle class avoided the vortex, not by destroying it, but by retreating outwith its area of centrifugal attraction.

In 1871 Dr Alexander Wood involved himself in yet another Edinburgh institution - the Edinburgh Street Tramways Company. This enterprise was not welcomed into the city as the saviour of decency and moral propriety, and even although this may have been acknowledged reluctantly in later years, there grew up between citizens and company a curious love-hate relationship which survived the twenty-two years of company operations in the city.

In September 1870 Edinburgh Town Council received plans for a proposed tramway system for the city. The promoters preferred to remain anonymous at this stage and submitted their proposals through the agency of H and I Inglis, eminent railway solicitors in the town. Their proposed routes radiated from the central business district of Princes Street and York Place to the desirable residential suburbs of Newington, Murrayfield, Morningside, Portobello and Grange. The main Edinburgh to Leith thoroughfare of Leith Walk was not projected since it was understood that another venture was contemplating this route. In November this assumption was proved correct when another set of route plans was presented to the council. This later network covered all the original links plus routes to Leith, Newhaven and Coltbridge.

Both the Town Council and City Road Trust viewed the applications with a certain amount of distrust, and the Lord Provost in particular was hostile towards their requests. He looked upon the first scheme, the Edinburgh and Leith Tramways (the promoters consequently added the Leith Walk to their plans) as an outside speculations with no local involvement;¹ he feared such a venture might lay down track in the town and then pull out if the promotion were not a success and leave the rails in the roadway to rust. He would not allow "streets like Princes Street and Leith Walk to be tampered with by any flying jackanapes".² Some of his suspicions were indeed well founded since the report of the City Road Trust on the schemes revealed that the enterprise was backed by Morton Coates Fisher and American associates.³ The second proposal gained more approval, not only because of its more extensive coverage of the city, but more important, it was found to include several local notables, among them the ex-Provost of Leith and a former MP of the city. Such personalities went a long way towards dispelling fears of foreign speculation.⁴

¹ Letter from the Lord Provost in the Scotsman 18.12.1870

² City Road Trust (CRT) meeting reported in the Scotsman 18.10.1870.

³ Edinburgh Evening Courant 28.12.1870.

⁴ Letter from Councillor Murray in Scotsman 31.12.1870.

The rival promotions realised that both could not operate on the streets, and the obvious advantages of the latter venture secured its success in buying out the original project for some undisclosed sum.¹ It now remained for this second promotion, the Edinburgh Street Tramways Company, to bargain with the local authorities for their consent before going to Parliament for its enabling act. The company paid an appreciable sum for the local authority's vetos. The final agreement gave the council the power to regulate traffic, option to purchase the undertaking at seven year intervals, and the power to make related by-laws. The company had to maintain its head office in the city, and pay £2,500 to the council to defray some of the costs of widening the North Bridge, since the council saw this as a traffic bottleneck which the tramways could only aggravate. The fare was set at a penny a mile with a minimum fare of two-pence.² It is clear that the council was determined to maintain its control over the streets, and its head office location requirement would ensure local operation.

With this arrangement the promoters went to Parliament, but on the last day for lodging petitions against the bill, the Caledonian Railway Company claimed running powers over the proposed lines. Since two of the tramway promoters

¹ CRT Minutes 10.1.1871

² Edinburgh Street Tramways Parliamentary Proceedings.

Scottish Records Office PYB(2)/2/10

were also directors of this railway company the claim had a certain amount of hope of success. The North British Railway Company immediately appealed against this and stated that such powers would give their rivals access to the whole city in direct competition with the expensive rail links the North British had so recently built to Leith and Portobello. The fact that the Lord Provost was a North British director explains much of his fanatical opposition to the whole idea of tramways in the city, and he must have been pleased to see his company win their appeal.¹ The Edinburgh Street Tramways Company got their act on June 28 1871.

When the company's prospectus was issued in August the seven named directors were all local businessmen² and the company's solicitors were Ashurst, Morris and Co. Morris had done a good job in Edinburgh; appointing Wood to the board gave the company local integrity and selecting three non-North British railway directors gave the promotion an additional incentive to succeed. Morris himself, named as a director in the Parliamentary proceedings did not advertise this fact to the Edinburgh subscribers. Share applications numbered five times those on offer and the £150,000 was

¹ Edinburgh Street Tramways Parliamentary Proceedings.
Scottish Records Office PYB(2)/2/10.

² The directors were Robert Hutchinson, Chairman of the Edinburgh and Bathgate Railway Co., Daniel Ainslie, Director of the Caledonian Railway Co., John Crabbie, Director of

taken up very quickly. The undertaking intended to take on no unnecessary risks and its prospectus stated that "there already exist in Edinburgh certain established lines of omnibus traffic, well patronised by the public, along which tramways will in the first instance be carried".¹ Public opinion, as reflected in the local press was eager to experience the delights of the tramcar. "Instead of noisy, jolting omnibuses, often worked with difficulty, and not infrequently with danger, especially in winter, by three horses, we have the prospect of light and commodious cars gliding softly and almost noiselessly along upon indiarubber springs, with one horse, without effort performing the work of three",² assuming of course "we are to have the advantage of first, second and third classes."³

James Gowans, railway contractor and Lord Dean of Guild Court, won the construction contract, and on November 6 1871 the first route was opened between Haymarket and Bernard Street, Leith via Princes Street and Leith Walk.

the London and Edinburgh Steam Shipping Co., John Dickson, Director of the National Bank of Scotland, James Taylor, Director of the Caledonian Railway Co., Dr Alexander Wood and Lieutenant Colonel Ryley.

¹ Company prospectus in Scotsman 5.7.1871. ² *ibid* 16.9.1870 ³ *ibid* 27.1.1871.

By linking the business areas of Edinburgh and Leith, and providing intercommunication between the main stations, the company had creamed off by far the most lucrative trade in one initial investment. In the following year the Newington-Grange-Morningside circle was completed, although not without arousing some antagonism. The City Road Trust saw its road surfacing specifications flouted by the company's engineers and decided to bring the issue to a head by stopping construction on the Grange route by encouraging frontagers to invoke their right of veto wherever possible. To this end the Trust engineer reported on all sections of the proposed line which violated the 9'6" minimum rail/pavement distance ruling. The company, in a public notice, replied to this attack by calmly stating that since their operational rights had been conferred on them by private act, and not through the procedures of the General Act, the instrument of frontagers veto was irrelevant to their cause.¹ This rebuff to authority was a repetition of earlier months when North Bridge proprietors sought to prevent a double line of track being laid in the street as they thought it to be too narrow. The company laid its double line, which was removed only after litigation. In all, by the end of 1872 the company had taken on a Jekyll and Hyde role; 80,000 journeys per week were being made on the tramcars,

¹ *ibid* 11.5.1872.

'a mode of locomotion which is highly prized by those of the middle class who cannot afford carriages of their own',¹ but at the same time it appeared to be flouting city authority to achieve its own ends. Public outcry reached a crescendo in November 1872 when the company announced its intention of seeking Parliamentary approval to run omnibuses and extend the time limit on the construction of the remaining lines. The Town Council opposed the bill; the council had supported the company in 1871 because its scheme was the more comprehensive, but now, with the most profitable lines built, they saw the undertaking backing out of its less remunerative commitments.² This opinion was repeated by the Committee of Owners and Occupiers of Property on the Tramway Lines in the City of Edinburgh, who saw the company as a quasi-foreign venture manipulating the city fathers for its own ends.³ This combined opposition won considerable concessions in the following Parliamentary confrontation. Board of Trade opposition made the directors drop their steam power application, but the company got their year's extension rather than the right to run buses; the company had to accept the Board of Trade supervision clause referring to consumer satisfaction after three years working (See p.42) and was liable to fines of £50 per day on lines not completed on time.⁴ Such arrangements placed the company

¹ Letter from JC, *ibid* 20.6.1872

² Town Council Minutes (TCM) 14.1.1873

³ Scotsman 25.2.1873

⁴ Edinburgh Street Tramways Act 1873

more under the control of the council and citizens; the Committee of Owners and Occupiers was triumphant. The front page of the Scotsman for 5.8.1873 was given over to a clause by clause account of its victory; "These clauses have a practical importance which can scarcely be over-rated; they may be made the means of so modifying the tramways in Edinburgh as to render them advantageous to the whole city, instead of being, as they now are, a confiscation of large and varied interests, for the sake of very equivocal advantages."¹

No sooner was this trial of strength over than the company initiated another. In November 1873 it published its intention to abandon the lines to Stockbridge and Trinity because it now realised, in the light of experience, that the gradients involved were too severe. The Town Council could say very little since its commitment to the company to widen the North Bridge within two years of their original agreement had not been carried out; the company promised not to ask for its money back. The company's plan to provide these areas with omnibus communication was questioned only by the City Road Trust, whose persistent opposition won for them £3,000 from the company to pay for causewaying streets partially maintained by the company. This was a simple piece of political blackmail since both the Town Council and the Board of Trade would sanction the

¹ Scotsman 5.8.1873

company's proposals to abandon the two routes.

This opposition to whatever the tramway company proposed was the outcome of a split in the anti-tramway lobby in the city. There were those who simply wanted no more lines to be built¹, and there were others who, although against the company, wanted the remaining lines to be built simply to show the company who was the boss in the town. It was rumoured that a deputation from Stockbridge had been got up to pressure the council into demanding their line to be built, not so that tramway communication might be effected, but so that once the line was built Board of Trade approval would be refused on the grounds of safety, and the company would have added the expense of lifting them.²

With the opening of the Leith to Trinity line in January 1874, the Portobello line in May 1875, and the commencement of omnibus services to Stockbridge in November 1874, relations between council and company mellowed, with only one major legal tangle over fares policy³ straining the arrangement. It was only after this five year period of infighting that the city's tramway's physical

¹ Courant 2.2.1874. Report of the fifth shareholders' meeting.

² ibid 1.8.1874. Report of the sixth shareholders meeting

³ See D L G Hunter Edinburgh's Transport 1964 pp 25/26.

rather than political, presence became appreciated.

The area of rapid building at this time was in Merchiston and Greenhills, with many of the new houses advertised as standing close to the tramway line at Morningside.¹

Residents themselves quickly took advantage of the tramcar's speed and comfort, and by the second half of the 1870's, both the town council and the company were receiving petitions from residents' groups seeking extensions into their areas.² In response to this demand the company proposed several route extensions in 1878; namely, to double the Portobello line to allow an extension to Joppa; and to build two spur lines, one from Haymarket to Dalry Cemetery, and the other along Merchiston Place and Spylaw Road. The main aim of the bill was the Portobello line and when the County Road Trust refused to go along with the track doubling, the company dropped the whole procedure; the remaining lines were not worth the Parliamentary expense.

¹ Scotsman 22.1.1874 for example carried the following advertisement for Mayfield House, built in 1868 and costing £2,350. "A most desirable House, with Tramway and 'Bus conveyances close by."

² TCM 11.7.1878.

When the Town Council finally gave its permission to allow steam trials in 1879,¹ the company resubmitted its proposals for doubling the Portobello route on which the trials would be held. The Dalry and Merchiston extensions were included, as was another addition to the Newington line, taking it to Mayfield Toll.² This time the council tolerated no give and take, it decided to control the expansion programme. All the lines save the Merchiston route were approved, but because the council thought the company were getting the use of the streets for next to nothing, it demand that these new lines be purchaseable at the same time as the original lines. This stipulation was the decision of the town council acting as the town council; its other arrangement was the result of the town council acting as the mouthpiece of the powerful Merchant Company of Edinburgh. The Merchiston route proposed by the company ran through an area already built up; the council suggested a more northern route along Gilmore Place and Polwarth Terrace, and from there there should be an additional link with the Dalry terminus via a new road, now Harrison Road, so as to bring the area into direct contact with the North British Railway Company's Haymarket Station. This route would open up the unbuilt land of North Merchiston and so enhance its feuing prospects. The council's interest in this arose from the fact that the Merchiston estate

¹ TCM 2.12.1879. ² TCM 24.1.1882

was owned by the Merchant Company, some of whose members comprised around half the council and included the Lord Provost and Treasurer.

This Town Council/Merchant Company axis threatened the tramway company into this speculative line in two ways. If it did not build this 0.75 mile line, costing around £4000 or £200 per annum, it would charge the company £100 wayleave per annum per mile on the six miles of line proposed; obviously the former choice was more attractive. Secondly the company was notified that if it did not build as recommended, another tramway company would be set up to do so, and with the council backing, it would easily gain running powers over all the lines in the city.¹ The company had no choice; the Press saw the council's circular route proposal as a civic endeavour to link tramway facilities and the proposed Edinburgh Suburban South Side Railway into a unified transit scheme for the city. The fact that Sir James Falshaw, director of the North British Railway Company, ex-Lord Provost and ex-Master of the Merchant Company was the chief promoter of the railway scheme served only to cloud the issue still further. Public opinion saw only the self-interestedness of the company, and there were even suggestions of municipal control over what

¹ Courant 1.2.1881.

"has become an institution", "an adjunct to the requirements of modern society."¹

The final extension carried out by the company was to move the Morningside terminus further into the suburbs. The council agreed to the line as long as it was subjected to the 1871 purchase timetable. The residents in the areas sought the extension in 1881,² and even went as far as promising to pay half the capital expense involved. (They appear to have broken this promise). In the same year, 1882, the tramway company promoted its Mechanical Powers Bill in an attempt to make steam power a permanent feature on some lines. The council had other ideas; not only would steam tramcars be "destructive of the amenity of the City, dangerous and prejudicial to the interests of the owners and occupiers of properties,"³ but just as important within the company/council power struggle, such an act "would still further complicate the relations between the Council and the Company, and weaken the control of the Council over the streets by the introduction, at every point, of the Board of Trade as a superior authority."⁴

¹ *ibid* 2.1.1881.

² TCM 20.12.1881. ³ TCM 5.6.1882. ⁴ TCM 24.1.1882.

The following eight years were a period of relative calm, and little intercourse took place between the two parties, apart from repeated company applications for the use of steam which the council continually refused. In 1890 the final round of bargaining began, and centred on the question of local authority purchase. The council realised that many of the past difficulties could be overcome if there were only one authority over the streets, and local authority acquisition (not operation) would achieve this end. However, to put the problem into perspective, the company's situation over the previous twenty years must be considered. The Town Council, because of financial disinterestedness, could assume the air of high civic purpose thwarted by economic selfishness; the company had to run efficient services, pay out a dividend, and continually assure shareholders that their capital was never at risk.

By the time the Edinburgh Street Company held its first shareholders' meeting on December 27 1871, the three English promoter/directors had retired. Morris and his friends had left. The first six miles of tramway had involved the raising of £80,000 capital, of which £13,000 went in Parliamentary expenses and buying off the American opposition.

It took only one year's operation to throw up the company's major problem; the steep gradients of Leith Walk placed

severe strains on the horses which resulted in higher than anticipated horsing expenditure. The fact that the company were at this time hiring their animals from John Croall, an ex-omnibus proprietor who accepted the arrangement in return for dropping his opposition to the company's original bill, further inflated this expense. Croall was charging 10.75d per mile run for horsing, whereas actual costs were nearer 7d. The gradient on Leith Walk of 1 in 11 required four horses per tramcar for successful negotiation.¹ Given such contractual and physical demands, it is no wonder that the company was a leading protagonist in the battle for steam powered cars. Their bill of 1872 originally included a steam power clause before Board of Trade pressure removed it. The bill also sought extension on the building time for the Trinity and Stockbridge routes, not only because the price of iron was high at the time, but it was also an attempt to delay building until the steam question had been settled since steam power required heavier rails than for horse traction. The following year the Board of Trade agreed with the company that the routes were too steep for safe operation, and the company were ordered to run omnibuses on them.

Prior to, and following, Parliamentary approval of steam

¹ A W Brochie The Evolution of the Edinburgh Horse Tramcar in Scottish Transport November 1971 No 21 p 2.

trials, the company had experimented with several steam tramcars.¹ These were all held on the rural Portobello line but Corporation opposition prevented major progress. To the directors the steam tramcar promised much lower working expenses and an end to the continual bad publicity about the treatment of their animals;² to the Lord Provost steam tramcars were too much like the steam trains that ran on his company's rails to Portobello and Leith. It was during this period of experimentation in the later 1870's that the first rumblings of a shareholders' revolt disturbed the board. At the general meeting of July 1877 the intentions of the management were questioned. Was it good for the undertaking to have one man, Duncan Paterson, performing the functions of secretary and legal representative? Did this explain why the company had recently spent £1800 on legal fees to lose a damages case, to lose the Leith fares case, and to have their latest Bill thrown out of the House on Standing Orders? Again, why did Gowans get all the construction contracts: why were the jobs not put out to open tender? The shareholders did not want expensive steam trials and the added capital commitment implied if such trials were a success. They did not want expensive legal disputes with the council.

¹ *ibid* p 4.

² See letters to the Scotsman for example, 6.12.1873 and 8.12.1873.

They did not want extensions into areas with growth potential. In all, capital investment was to be kept to the absolute minimum. This, however, became increasingly difficult as line renewals mounted up, especially in the busy streets of Princes Street and Junction Street. The only way the directors could maintain dividends was by increasing revenue, which in turn meant line extensions since fare increases were out of the question.

When the company's general meeting convened in January 1881, the extension proposals engineered by the town council were known. A Shareholders' Protection Committee had formed itself to oppose the moves; the directors were accused of furthering private land speculation, and even worse, by agreeing to the council's proposals for Merchiston in preference to their own, less speculative plans, the management was seen as pandering to the wishes of the council, "the Merchant Company ring, and Mr James Gowans, Councillor."¹ The directors refuted the first allegation, but Dr. Wood had to admit to council domineering; and Gowans made no secret of where his interests lay. On the very day that this company meeting was taking place, Gowans pressed the motion in the council that the lines in question be built irrespective on the company's attitude. He simply wanted the construction contracts.²

¹ Courant 1.².1.1881. ² ^{op}~~to~~ cit. 2.2.1881.

When the directors explained the threatening procedures exercised by the council the shareholders reviewed their stand and finally agreed to the plans if the clause in the bill seeking to raise more capital were deleted.¹ Throughout this affair, the small shareholders had considered but one thing, their future dividends.

With the passing of the 1881 Edinburgh Street Tramways Act, the new lines were gradually opened, until by the end of 1883 the system reached its maximum of 18.25 miles. A new manager, Mr Clifton Robinson, was appointed in that year, and he was plainly against further extensions of the 1881 type. "If tramways were to succeed, feuing must precede, and he hoped their tramways would not precede in order that feuing might succeed."²

Unfortunately for the management the question of more extensions could not die so easily. Late in 1883 a separate group of businessmen proposed a system of cable tramways for the Trinity and Stockbridge routes. The company opposed the scheme by submitting their own, identical one. Shareholders were not too keen on such a

¹ Courant 15.1.1881. Report on a reconvened company meeting.

² Scotsman 20.7.1883.

move, and got their own bill dropped; there was too much Parliamentary expense as it was, and the company was committed to a policy of consolidation, not expansion.¹ They refused to accept the balance sheet of 1884 because £1858 incurred in opposing the cable tramway bill was against their wishes. An interdict was filed on the directors who had to pay the costs themselves.

By the later 1880's the company had to start considering its future with regard to the town council's approaching option to buy them out. The directors were confident that no problems would arise since the council were too busy buying the gas company:² it was simply the uncertainty of the position that had to be cleared up. Leith Town Council were willing to forego their option, but Edinburgh was somewhat tardy. It was unfortunate for the company that the 1890's was a decade of little love between the two councils with Edinburgh trying to swallow up Leith with little success. Any ploy which might put the smaller burgh at a disadvantage was worth considering, and to split the ownership of the tramways along the municipal boundary could disrupt the inter-town communication considerably.

¹ Courant 1.2.1884 ² ibid 20.7.1887

The company went into the negotiations from a position of strength. By 1891 they had a well maintained system and a reserve fund of £75,000. Over the previous 21 years dividends had fluctuated around 6%, reaching a peak in the years 1877 to 1879. There then followed the construction investment of the 1881 Act which saw the dividend fall to a low of 3% in 1883. Line maintenance and renewal began to place an ever increasing strain on the revenue account and much of any increased receipts were syphoned off in this direction, so providing 'a source of great anxiety to the directors'.¹ The extensions themselves caused earnings/mile run to fall, from over 18d in 1882 to 15d by 1885, with a slow recovery thereafter as they generated their own business (See figure 5.1). Fortunately, this fall in earnings/mile was cushioned by a fall in fodder prices which only reversed after earnings had picked up. Fodder and bedding costs per horse per week fell continuously from 14/5½d in 1882 to 9/11½d in 1887, then rising to 10/7½d by 1890.

The company had no depreciation reserves as such, but amassed a sizeable reserve fund. The policy of setting aside £8,000 to £10,000 per annum was instigated by Clifton Robinson, one of the few men to anticipate the harsh and realistic working of the Purchase Clause. The fund was rarely touched, since capital renewals were charged to revenue before dividends were calculated.

¹ ibid 26.1.1881.

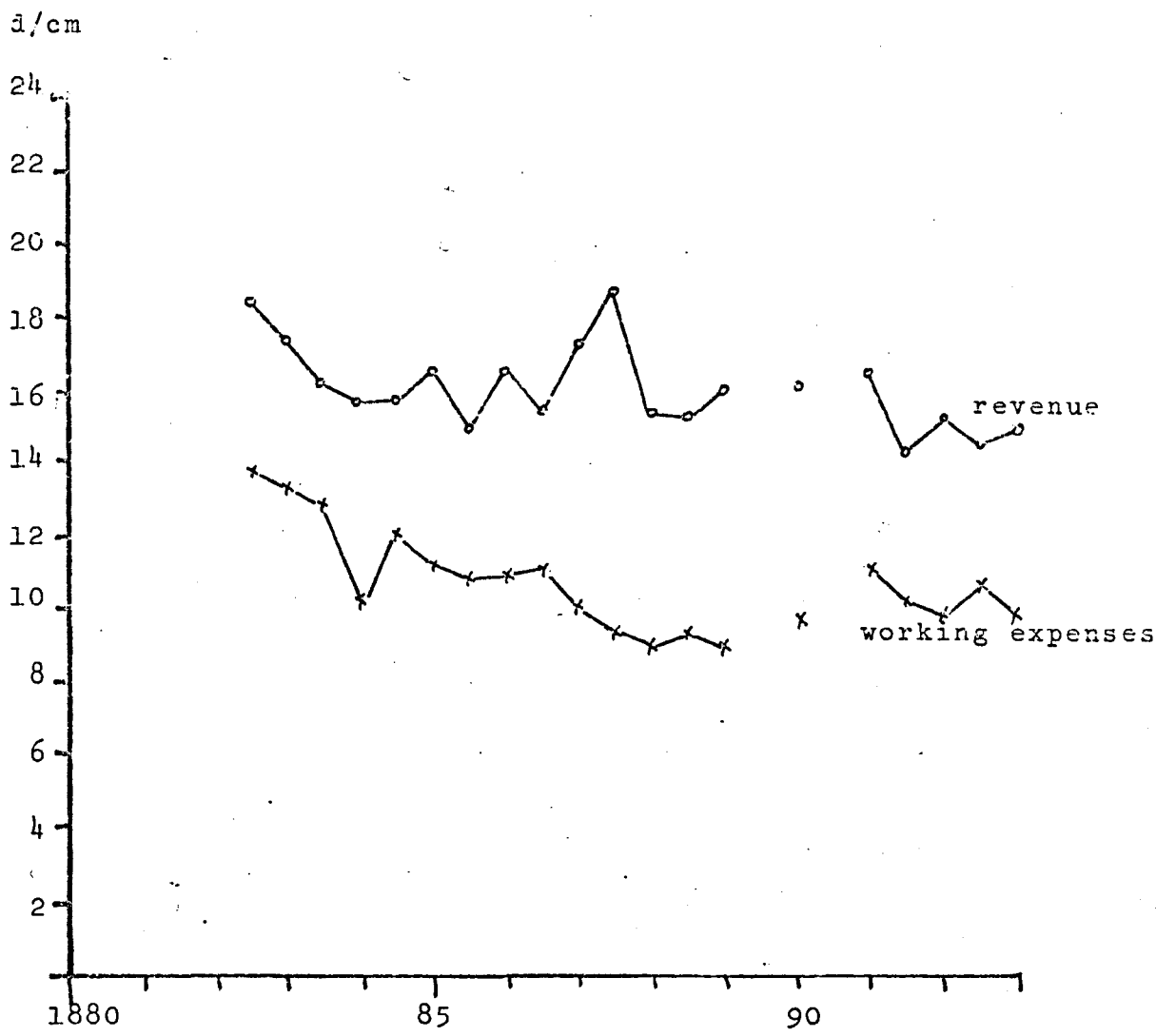


Figure 5.1. Edinburgh Street Tramways Company: Revenue and Expenses 1883-1893

Sources: Board of Trade Tramway Returns

Shareholders accepted this, as long as the expenditure was necessary, hence their concern over Parliamentary and extension expenditures. The main reason, however, for the company's prosperity while others declined, was that Scottish cities were more densely populated, so providing higher loading potentials per route mile. The tenement house was in effect a street on its end, and increased the tramcar's ability to provide a door-to-door service. For Britain as a whole, the average number of passengers per car mile rose from 7.2 in 1880 to 8 in 1890. The Liverpool figures were 7.3 and 6.5 respectively; the Glasgow figures were 11.7 and 11; and for Edinburgh, 9.9 and 11.1. Translated into earnings ability the Edinburgh tramway company's revenue/cm was 3d to 4d higher than the national average. That its dividends were the same as the national average explains the undertaking's financial soundness. Its 1000 small shareholders were content with 5% in later years. The 1880's saw consols fall steadily from 3%, making their tramway investment an attractive alternative as long as the directors could assure them their money was at the minimum of risk.

Before discussing the purchase negotiations, one other party has to be considered, and there again, the conservatism of the company's shareholders influenced events.

"In Newington and Morningside districts, and other parts of the suburbs, a considerable number of houses are in course of erection The increased railway and tramway facilities enabling business people with families to reside in the suburbs is creating a good demand for houses in that part of the city."¹ Such activity in the southern districts of the city in the 1880's only emphasised the stagnation in the north.

"It is well known, and, I believe, keenly felt by many owners of property in the North Side, that there has been a deterioration in the value of heritable property in that quarter. We need not be surprised that people will not pay rents for houses which are beyond the lines of ordinary access either by rail or tramway to their places of business, etc., especially when they can suit themselves in localities which are favoured either with one or the other."²

Little wonder then that in 1883 a group of local land-owners in northern Edinburgh³ decided to promote a cable tramway system to link their lands with the central area.

¹ *ibid* 14.1.1888

² Letter from 'Locomotion' in Courant 30.8.1886.

³ Scotsman 19.1.1884.

The very steep gradients of 1 in 11 which had precluded horse tramways provided the ideal location for cable traction. The promoters of the Edinburgh Northern Tramway Company had little interest in tramway operation, looking at the venture as a means to an end, namely raised land values. In the early stages of their promotion they approached the Edinburgh Street Tramway Co. with a view to amalgamation if their bill were passed, but the shareholders of the latter company would have none of it, and the council vetoed the scheme anyway because of insufficient data.

Late in 1883 more detailed plans were deposited; cable routes were to run from Hanover Street to Trinity and thence to Leith, and from Frederick Street to Comely Bank. The population in the northern areas were in favour of the scheme,¹ but the council was reticent. There were rumours that the local men were merely a front from some bigger out-of-town organisation - the Hallidie Patent Cable Company, at present building the Highgate Hill line in London, was looking for fresh

¹ Meeting of inhabitants of the northern districts reported in Courant 21.12.1882. Deputation of residents to the Town Council TCM 9.1.1883.

orders.¹ Certainly, the company's enabling act of 1884 was unusual by tramway standards. The promoters sought the right to sell out or lease their tramways; they agreed that the council could buy them out in 1892 - the purchase option date for the Edinburgh Street lines; and the capital involved seemed far beyond the means of those named in connection with the venture. The council approved the plans in return for the purchase date option and a payment of wayleave rent reaching £100 per route mile after five years' operation.²

The Edinburgh Street Tramway Company's identical bill never got past the council. "More than one councillor seemed to have nervous recollections of the time when the Tramway Company was with good reason suspected of possessing occult influence in the Council Chamber."³ With the Edinburgh Northern Tramways Act passed in 1884, the promoters still sought amalgamation. One of their number, Hamilton Beattie, architect and landowner, was a shareholder in the existing tramway company, and he used the general meetings as a platform from which to encourage a merger. The meeting of January 1885 was to be the crunch, with Beattie circularising shareholders to vote for amalgamation, and the company directors inviting co-operation "in defeating the tactics by means

¹ Public meeting against cable tramways, reported in Courant 15.12.1883.

² TCM 8.1.1884.

³ Courant 24.12.1883.

of which it is proposed to saddle this company with the responsibility of working new lines...."¹ The spectre of increased capital and new route risks gave the directors victory. The new company would have to go it alone.

Construction proceeded very slowly, and was in fact, carried out by the Patent Cable Construction Co. Ltd. of London. The first route, Hanover Street to Golden-acre, was opened in January 1888.² Much of this tardiness was due to the financial problems of the contractors who eventually went into liquidation in the same year. This collapse placed great strains on the credit of the venture, and it had to sell out to another contractor who then paid out the debts owing to the bankrupt concern.³ The second contractor, Dick Kerr and Co. of London and Kilmarnock had already taken over the patent rights of the dead company, and now used them to complete the construction demands of the Edinburgh venture.

¹ The company issued a statement in Courant 24.12.1883.

² D L G Hunter The Edinburgh Cable Tramways Journal of Transport History 1953/54 Vol 1 p 171.

³ See reports of the company meetings in Railway Times 9.2.1889 and 9.3.1889 Vol LV p 198 and p 327; and 7.9.1889 Vol LV1 p 300-01.

The company was now owned by Dick Kerr and Company, and several Scottish shareholders in the tramway company objected to the Stockbridge contract going to the new owners, accusing the board of making a contract with itself and accepting a grossly expensive estimate. This faction brought an action against the directors seeking to set aside the contract, but the directors in their turn raised an action against the promoters, one of whom, Beattie, had raised the former litigation, seeking the return of £17,000 involved in the initial promotion process.¹ In the end Dick Kerr preserved their new contract.

By the 1890's the company emerged as one of the tramway undertakings of the J B Glenn, Morris group with its largest shareholder one F Manuelle, a partner of Dick Kerr and Company. The internal squabbling froze dividends until 1894, but the overcapitalisation of the concern would have produced low returns anyway. Although expenses were around 50% of receipts, the capital account, for three route miles stood at £105,000 in 1891, or £35,000 per route mile. This was good business for Dick Kerr and Co.

On May 4 1891, the Town Council and Edinburgh Street

¹ TCM 29.7.1891.

Tramways Company started serious purchase negotiations. The company offered line extensions, mechanical power, £3,000 per annum wayleave payments, and a profit sharing scheme if dividends were over 6%; in return they wanted the council to maintain the status quo.¹ The council agreed to the terms but the company had left it too late to go to Parliament for line sanctions in 1892.² The council were unruffled, "although a whole year has been lost by the course pursued by the company, the Council ought not to allow any feeling on the subject to preclude it from considering any proposal on the basis of the Proposed Agreement should the company see fit to resume negotiations on that footing."³ In late 1891 the council were in favour of lengthening the life of the company (although it sought for itself more control over route planning) rather than committing the rates to outright purchase.

The company did, however, go to Parliament in that year to promote a bill enabling them to negotiate time extensions with local authorities. The act of 1892 had faced the

¹ TCM Report on the Negotiations 1.12.1891.

² The company agreed to line extensions on November 19th, and the latest date for submission of plans to Parliament was November 20th.

³ TCM 1.12.1891.

opposition of the council over a section which stated that the company had the right to operate as the lessee of any local authority in the area and utilise through running agreements arranged by such local authorities. The company were using their guarantee of non-purchase by Leith Corporation to ensure continued running powers in Edinburgh. The council's decision to oppose the bill was followed three months later by their decision to purchase. This latest round of expensive Parliamentary representations convinced the council of the inherent antipathy between itself and the company.

The actual purchase turned out to be in itself a long drawn out and costly affair with litigation reaching the House of Lords in 1894. The outcome has been discussed in Chapter Three. During the valuation wrangling, the Corporation advertised for lessees, and three came forward: the Edinburgh Street Tramways Co; the recently deposed Glasgow Tramway and Omnibus Co.; Dick Kerr and Co. The main conditions of the lease were twofold: rent was to be 7% per annum on the price paid by the council for the existing lines, (expected to be £185,000), and the lessee had to operate and pay the same rent on any extensions the council deemed necessary. Such a lease gave the council control over routes, fares, schedules, etc. without taking on a lot of risk. They could borrow the money at 3% and pay it back over thirty years, and their rate of return was 7%. From the lessee's

point of view the commitment to work on any extensions could be a blank cheque into bankruptcy. Both the Edinburgh Street and the Glasgow companies shied away and only Dick Kerr, in the guise of the Edinburgh Northern Tramway Company accepted the terms simpliciter. Dick Kerr, of course, had no interest in the risks of operating under such a lease, but had their eye on the reconstruction proposals. If their offer were accepted, they would 'cable' all the city's lines. The council at this time, 1893, wanted cable tramways on the steep Leith Walk route, but Dick Kerr offered 1d per mile fares on all converted routes and held out the carrot of one unified tramway system in the city free from the problems of horse expenses and cruelty.

In financial terms cable tramways were attractive to the council, and Dick Kerr knew how to push their case. "If the Corporation accept our suggestion for cabling, even to the extent of seven miles of route, the cost of which we shall assume at £140,000, the effect of it would be to secure to you a rental of £22,000, being 7% on a total expenditure of say £320,000."¹ (£140,000 plus the purchase estimate of £180,000.) Their case was all the more persuasive since electric traction was still a relatively unknown quantity whose ability to

¹ TCM 11.10.1893.

surmount steep gradients was questionable, whose overhead work ruled out operation in Princes Street, and whose use Parliament banned in 1893 when it allowed the council the use of steam or cable traction.

Within months of securing the lease in November 1893, Dick Kerr formed a subsidiary, the Edinburgh and District Tramways Company, to work the lines. This was contrary to the lease agreement which expressly forbade sub-tenants or assignees, but as we have seen, Dick Kerr were eager to rid themselves of operational commitments. The council could do little to stop them since, on finding opposition, the company made the subsidiary a partner in the lease and so raised them above the status of subtenant. The Corporation's legal advisor recommended no action, considering this new arrangement as having "the intent, probably for financial reasons, of placing the control and management of the tramways in the hands of certain assignees and sub-tenants."¹

This new operational company, incorporated in March 1894 to run the undertaking in conjunction with Dick Kerr and Company comprised local businessmen, with John Kerr and Manuelle, the directors of Dick Kerr and Co., as a director and major shareholder. With both these companies

¹ TCM 29.3.1894.

advocating cable tramways, and the apparent technical efficiency of the Edinburgh Northern routes, the council considered in detail the idea of total conversion to cable traction. In 1896 they came out in favour of the scheme; investigations into the merits of different traction techniques at their existing stage of development threw up the cable as best. The council's electrical consultant, Professor A B W Kennedy, favoured their choice. There were very few statistics of electric tramway costs in Britain, and the low speed limit of 8 mph in the city reduced the advantages of electric cars. Such factors as speed, gradients and amenity precluded overhead trolley traction, and Kennedy considered that under the Board of Trade building regulations the cost of the trolley system might exceed that of the cable.¹ In 1896 the Edinburgh Northern Tramway Company sought Council approval for an extension along Ferry Road; the council replied by offering to buy them out for £115,000 - the company accepted.

By 1897 the council had its own tramway system covering the whole town, a lessee to work it, and an intent to convert from horse to cable traction as soon as possible. The Leith Walk cable was opened to the public in October 1899, and the whole system (comprising 23.5 route miles)

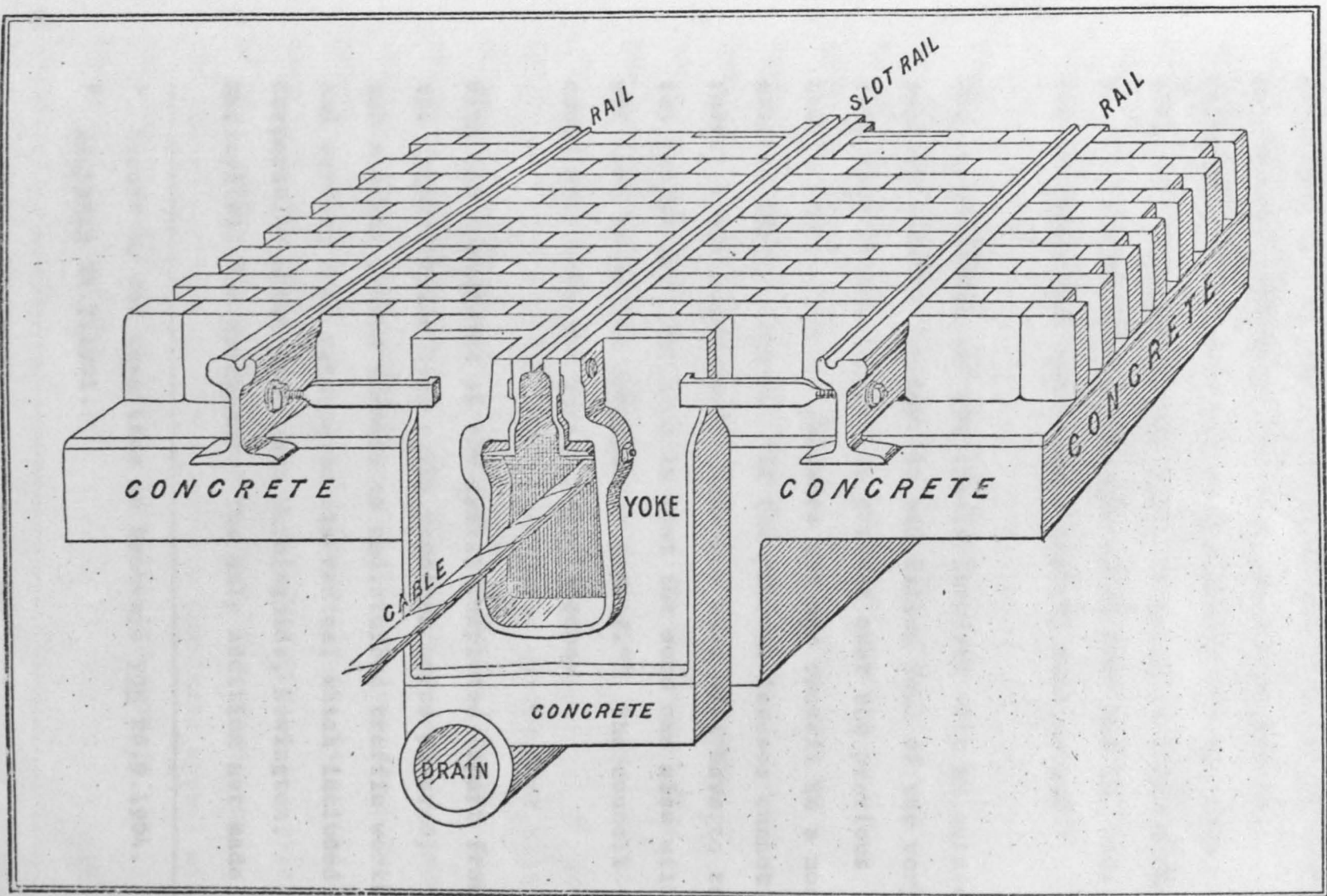
¹ Memorandum by Professor Kennedy Cable or Electric TCM 1896. This has put the council-company position in simple terms; for more detail see Report by the Lord Provost's Committee to the Town Council on the City Tramways July

was converted by July 1902.¹ The lessees for their part were none too happy with the arrangements. Their rental payments had fallen into arrears in 1901, and they claimed the system was unworkable while reconstruction was going on, and that some route junctions were impassable (see Diagram 5.1 for an appreciation of the technical difficulties of cable operation). In October 1901 the lessees offered to sell out to the council for £200,000.

Such actions make it perfectly clear that Dick Kerr were content with their construction profits, and saw little future in tramway management. By the following year a compromise had been reached whereby the rental was based on a rising scale so that the company could ease itself more easily into the new system. Not content with this concession, the company returned to the council in 1904 to demand a reduction in the capital account (upon which the rent was based) of £50,000. They argued that this amount was in excess of the estimates upon which they had signed the rental agreement of 1902.

cont. 1901; and Report by the Town Clerk to the Lord Provost's Committee on the subject of the Corporation Tramway Policy TCM 21.10.1905

¹ Hunter Journal of Transport History op cit p 184.



Diag 5.1 CABLE TRACTION TRACKWORK

Source : City of Sheffield Report on Tramway Traction 1897 p 102

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Since Dick Kerr and Company had picked up contracts to the tune of £580,000 out of a total conversion programme of £842,000 the Tramway Convenor of the council was rightly indignant; "On what grounds should the Corporation, who have had to pay nearly £50,000 more than they expected in May 1902, be asked to allow deduction of the same to the very people (Dick Kerr and Co. Ltd. the co-obligants) who (unexpectedly?) receive it?"¹

The town council had got itself involved with an outside, self-interested company: it had fallen foul of the very situation it had strived to prevent over the previous thirty years. Public pressure put the council in a most embarrassing position. "If the present lessees cannot fulfil their engagements, some one else will have to take the matter up. Our hope is that the some one else will not have to be the Corporation itself."² The council could only hope for better days to come.

With the conversion of the system completed (apart from the Gilmore Place line which remained horse powered) the company looked forward to undisturbed traffic working and earning some returns on its routes, which included Corporation extensions into Morningside, Newington, Murrayfield and Marchmont. The only addition not made in

¹ Report by Sub-Committee on Tramways TCM 28.9.1904.

² Scotsman 24.7.1901.

a residential area was in Gorgie, but this must be seen as a move within the general phase to extend all termini to the city boundaries. The previous few years had been expensive for the council with the capital account standing at £1.3 million in 1905. Deducting payments made for the original companies, conversion had cost £960,000 for 24 miles, or £40,000 per route mile; twice Dick Kerr's estimate of 1893.

Their rent, however, rose with expenditure, and so "it is not so much the Corporation, as the lessees who are to be commiserated, if it be the fact that one half of the expenditure was unnecessary."¹ The lessees may have appreciated higher dividends based on low capitalisation, but Dick Kerr were well pleased with the contracts. If the tramway company were unhappy, then it stemmed from the operational/constructional dual purpose of its existence.

By 1905 the company had started to pay a dividend of 5.5% on preferred shares, and things looked well. Then the council proposed the conversion of the Gilmore Place line to electric traction and the building of a new electric line down Broughton Street. The company opposed the proposals on the grounds that anything but cable tramways was contrary to the spirit of the lease. Since the Gilmore Place line existed prior to the lease agreement the Parliamentary Committee agreed with the company, but the decision went against them on the Broughton Street route.

¹ Town Clerk's Report 1905 op cit p 12.

In 1907 the council sought to extend the Gorgie Line to the new slaughterhouse being built there. The company again objected, describing the line as a speculative venture designed to enhance a town council development. At the Provisional Order Inquiry in July 1907 the council argued that the erection of the slaughterhouse, and plans to resite the Royal (Dick) School of Veterinary Studies and the Corn Exchange in the same site would produce a remunerative passenger flow; the company disagreed. The commissioners granted the order, but added that the company were not liable to rent on the line until these three public buildings were in use.¹

To be fair to the lessees, the Gilmore Place conversion was planned to be surface contact to allow intercommunication with the cable network; the company had conceded to overhead electric in return for some say in the formulation of future expansion programmes, but the council was firmly against the overhead system. On the whole, by the late 1900's it was clear that the lessees were opposed to expansion and any attempts to introduce electric power would be challenged. Both Gilmore Place and Broughton Street were built as cable lines, this at a time when such traction was described as dated and too expensive, and it was now realised that its capacity to serve suburban areas was more than questionable. The one suburban

¹ Report on the Provisional Order Inquiry in Scotsman 24.7.1907.

exception was the short electric line opened in Slateford Road in July 1910. The Tollcross engine house could accept no more cable, thus the planned Gorgie Road approach to the cattle market/corn exchange complex had to be passed over in favour of an overhead electric line in Slateford Road. The company agreed to the line,¹ and of course, Dick Kerr won the contract to build it.

Even although the company continually gagged council enthusiasm for lower fares,² electrification and extensions, its operating expertise was never consulted. Both the Broughton Street and Slateford Road lines were unprofitable as the directors had predicted, but this did not bring councillors to their financial senses. The expected antipathy of the lessees had made extension proposals unusually rare in the 1900's, but by the end of the decade the council were considering their strategy for the post 1919, end-of-lease period, and now municipal zeal as experienced elsewhere began to grow out of hand. But if the council was toying with the idea of great expansion based on electric traction there were others not content to await the expiry of the lease.

¹ TCM 1.3.1910.

² Notes on Conference between the Tramways Committee and the Tramway Co. TCM 7.2.1906.

The Edinburgh and Queensferry Tramways Co. sought to link the two places designated in 1905, and the Corporation gave their consent in return for the company subjecting themselves to purchase by the Corporation at any time after six months notice.¹ In the following year the Edinburgh and Suburban Tramways Company planned to lay lines to Nether Liberton via Dalkeith Road. This local venture received the initial approval of council and lessee, as long as the latter were under no obligation to operate the lines at any time in the future. Again, the promotion had to accept the six months purchase option, and agree to pay wayleave of £500 per annum.² This scheme collapsed under the pressure of manufacturers in the Pleasance who saw the trams as cluttering up their business thoroughfare, and the residents of Lady Road whose peace would be disturbed. Some saw the demise as a good thing in that no overhead wires would yet scar the city: "further time has been given to watch and take advantage of future tramway inventions and developments while safeguarding the city's amenity."³

¹ Memorandum for agreement between the Town Council and the Promoters of the Edinburgh and Queensferry Tramways Company 1905.

² TCM 22.1.1907.

³ Scotsman 23.1.1907.

In 1909 the Colinton Tramway Company sought to connect Redford Barracks, then under construction with Craiglockart and the tramway network. This project eventually came to nought,¹ but like the others, it highlighted the effectiveness of electric tramway traction in suburban locations.

The Corporation followed all these schemes with close interest. Its main concern was to protect the financial integrity of its own system, with the rights of purchase gained from the promoters. The Corporation saw these enterprises as useful route developers and experiments, but in general, public transport was to remain in the hands of the town council. The Town Clerk's policy of 1905 was adhered to; "It is not desirable that an independent company or outside body whose main object is the acquisition of gain should possess any permanent exclusive rights in or over the streets of a large city, where the Local Authority is able to take up the service. That, however, assumes that the Corporation will construct and manage the undertaking with prudence on sound business principles, otherwise the result may be more disastrous to the community than if a company were allowed to earn a profit as the consideration for taking risk and trouble."²

¹ Hunter Edinburgh's Transport op cit pp 144-146

² Town Clerk's Report 1905 op cit p 1.

Their own lessee had profited admirably within the city's sphere of operation. From 1895 the Edinburgh and District Tramways Company encouraged the council to convert the system to cable traction as soon as possible, but once under way, it made the surprising admission in 1900 that dividends would have to be suspended because capital expenditure was running three times higher than expected. With the construction phase and its upheavals over, dividends were restarted in 1905, with the ardent hope that no more extensions would be made.¹ Their oppositions to such proposals in the following years ensured that route mileage remained at 23.5 until 1908 when small additions raised it to 25.75. This pressure meant that the preferred dividend of 5.5% was only unpaid in 1900 and 1901, and bonuses in later years raised it to 8.5% with a peak of 10.5% in 1911. £15,000 of deferred shares, not liable to a 15% bonus at the end of the lease, did even better. From 1900 to 1908 no dividend was returned, but in 1908 and subsequent years the dividend fluctuated between 10% and 50%.² Dick Kerr and Company were the major holder of deferred shares.

After 1902 the tramway undertaking was sound; cable tramways reduced working expenses from over 9d/cm to around 5.5d/cm, (See Figure 5.2) resulting in lower fares, increased passenger demand, and a confident ability to pay their

¹ Report of the Edinburgh and District Company meeting in Scotsman 20.1.1905.

² See page 259 for dividend details

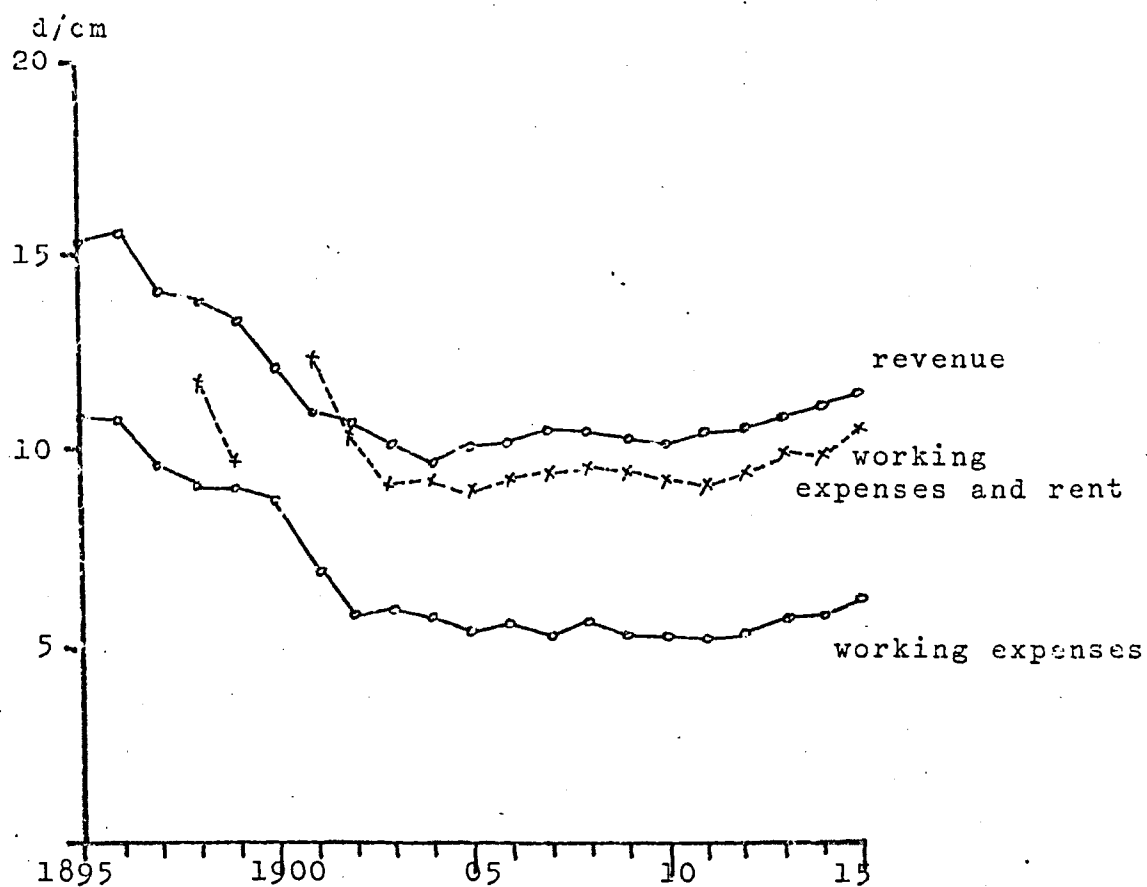


Figure 5.2. Edinburgh and District Tramways Company:
Revenue and Expenses 1895 -1915

Sources: Board of Trade Returns and company reports

rental which amounted to £100,000 per annum after 1908. Company control over fares meant that they were higher than average. In 1906 the average fare per passenger was 1.13d, in Glasgow 0.94d, London 0.97d, and of the major systems only Manchester (1.89d) and Salford (1.28d) exceeded the company's fares. With the exception of Leeds, the company had the lowest expenses/revenue ratio of 53.74%.¹ Its capital commitment, being in the form of a rent to the Corporation, was a statutory, not an accounting obligation, and so ensured a realistic split between dividends and capital reserves. The lease arrangement had the merit of preventing either party from indulging in practices seen elsewhere; the council had difficulty in building extensions and no power to reduce fares, and the company had no opportunity to run down capital for higher dividends. The result was a well-based and well maintained network. The great expense of cable expansion, both actual and in relation to electric tramways, discouraged suburban extensions, which in turn tended to ossify the housing frontier and maintain high passenger demand per route mile necessary for effective cable operations. The question of electric additions met the problem of intercommunication between routes since the heavier electric cars would damage the light track used by cable cars, and a dual power system meant

¹ loc cit.

different rolling stocks and maintenance experience. The council toyed with the idea of dual traction, but such schemes proved inadequate, especially since Princes Street could not be violated by overhead wires.¹

As the 1910's progressed, the council, in anticipation of future operation, discussed extension plans and traction methods. Self-propelled cars and trolley buses received a lot of attention, the former because they needed no overhead work, the latter for their suburban expansion abilities.² The route proposals of 1912 were somewhat heroic,³ suggesting link-ups with Blackhall and Nether Liberton, and the 1913 proposition to lay a line through Colinton Hospital Grounds to Comiston Road was defended in part, as providing a pleasant 5.5 mile circular tour via a Barracks, a Hospital, a Poor House, and a golf course. It may have given the citizens an 'airing' but the financial prospect would have been somewhat dark.

Fortunately the lease prevented snap decisions, and little was done. A more realistic approach was taken by the the professional expertise hired by the council in 1916

¹ Report by Deputation to Visit.... and inspect different systems of Tramway Traction January 1907. TCM.

² Tramway Committee Report on Railless Traction TCM 25.7.1911.

³ TCM 26.9.1912.

to look into the future of their transport system.¹ Their conclusion that, if extensions be made, then overhead electric traction was best suited to the task, rang the death knell of the cable tramcar in the city. The cable tramcar left a sizeable legacy for its predecessor; its main achievement had been to prevent undue expansion which could easily have resulted in financial collapse. In 1916, the fifteen towns in the country whose populations exceeded 200,000 had an average population per mile of track ratio of over 10,000; the Edinburgh ratio was almost 13,000.² The frustration expressed by the Tramway Committee Convenor in 1916 emphasised the pitfalls the cable tramcar successfully negotiated, with the more obvious help of the lease; on being appointed convenor, "A man took it up dreaming dreams of furthering the growth of the city by extending lines into the country, of making Edinburgh an earthly paradise, only it was to be intersected with tramlines instead of streets paved with gold" but soon found himself "in the grip of a lease which was absolutely binding."³

¹ Report upon the Tramway System of the City of Edinburgh October 1916, by J A Brodie, Liverpool City Engineer, J B Hamilton, Leeds Corporation Tramway General Manager, and H Campbell, Edinburgh Burgh Engineer.

² *ibid* p 59.

³ Scotsman 13.4.1916.

When the Corporation took over the running of the system on July 1st, 1919, they had already decided on conversion to the overhead electric system of traction.¹ The first thing done was to lower fares and raise wages, and by the end of the year the City Chamberlain was advocating a return to original prices if a loss were to be averted on their first year of management. The previous fifty years of private operation in the city made it politically imperative for the council to prove that it too could run the undertaking without rate aid. Fares should be raised to "ensure a revenue being earned sufficient at least to make the undertaking self-supporting."² Freedom from the lease was not going to take Edinburgh closer to Heaven after all.

Since Portobello Power Station was not yet completed, and post-war inflation had increased capital costs significantly, no conversion was undertaken until 1921. Additional services in the interim were catered for by omnibuses. In 1920 Leith was finally absorbed into Edinburgh, so ending 23 years of confusion at the old burgh boundary of Pilrig on Leith Walk (See Appendix 5.1).

With conversion beginning in 1921, working expenses over the system as a whole began to fall; in 1922 tramway

¹ TCM 2.4.1919

² TCM 28.10.1919.

expenses were 20.185d/cm, with the electric routes costing 14.67d/cm (See Figure 5.3) and "it is particularly noticeable that the traffic is becoming heavier on the new Electric System, especially at rush periods."¹ The conversion was carried out quickly, the first route opening on June 20, 1922, and the last cable car running on June 23rd 1923. The operation itself, however, partly because it was delayed in the immediate post-war years and partly because it discouraged cable renewals, meant that the city took full advantage of the petrol 'bus. By 1924 the Corporation were running 329 tramcars and 88 buses and charabancs, the latter being used to an important extent as route developers and termini linkers.

The reserve capital of the buses once the tramway system had been completed proved a useful weapon for the General Manager as he countered a welter of extension proposals in mid-1923; the criterion for expansion was still profitability, and most of the proposals were described by him as premature, or speculative, and "now that the Corporation has a fleet of motor-buses, there is no excuse for making mistakes of this kind, as the traffic can first be tested by these vehicles."²

¹ Tramway General Manager's (GM) Report on Fares. TCM 7.12.1922.

² GM Report on Extensions TCM 5.7.1923.

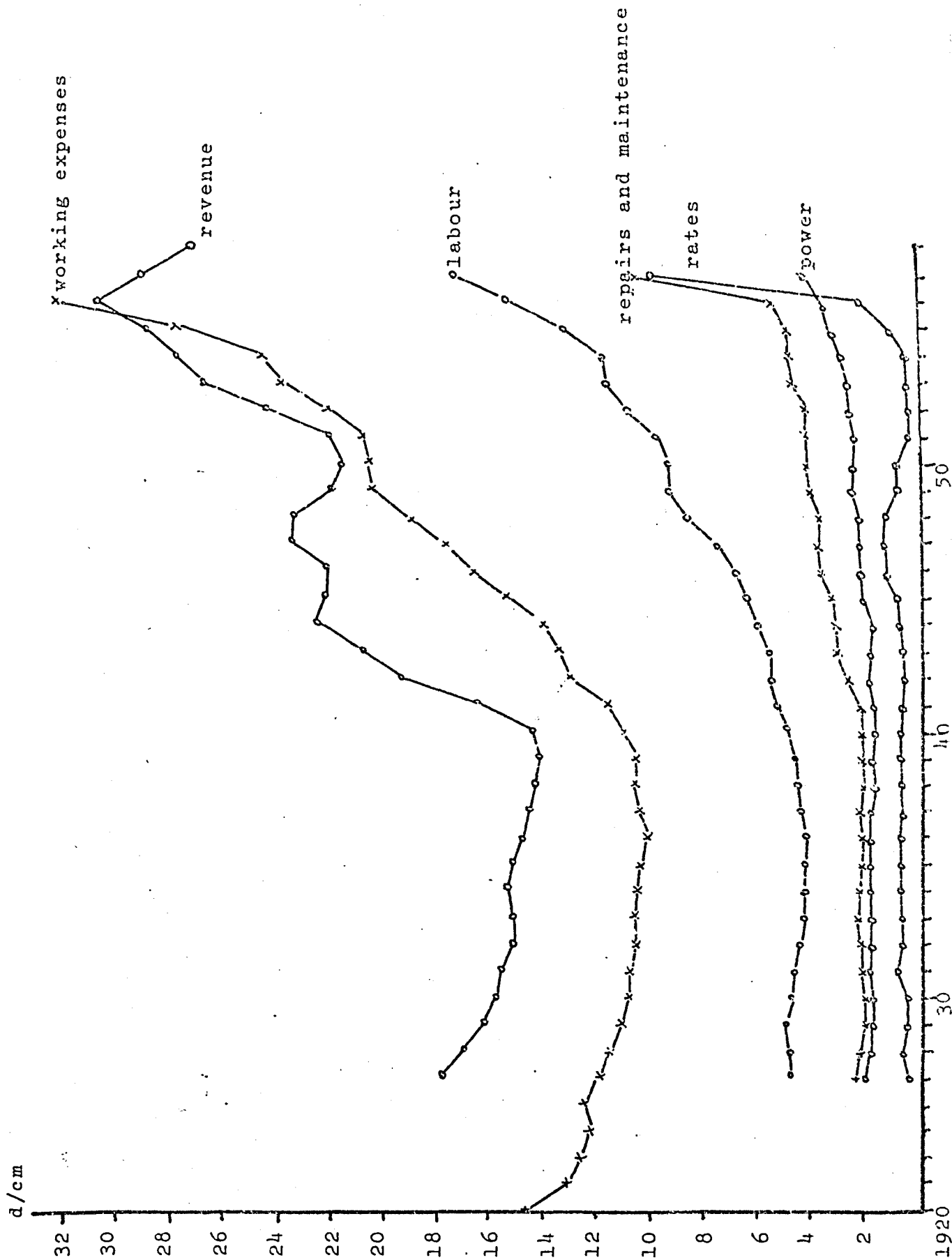


Figure 5.3. Edinburgh Corporation Tramways: Revenue and Costs 1922-1956

Sources: Tramway/Transport Department Annual Accounts

By 1927 the electric tramway system and its extensions was virtually at its maximum, comprising over 42 route miles. The main extensions consisted of termini advances in Colinton, Liberton, Costorphine, and lines laid along George Street to relieve the pressure on Princes Street, and along Seafield Road to link the previously separate systems of Portobello and Leith. In that year plans were discussed to push out the Costorphine line to the Maybury Roundabout on the Glasgow Road, and extend the Saughton and Braids Hills lines.¹ Simultaneously, pressure was applied by the Tramway Committee for the introduction of a 2d maximum fare, a move deplored by the Manager because the suburban routes were not paying their way as it was.² He did favour the Braids extension because "housing is developing considerably at Fairmilehead, and I believe that, if the tramway were extended to this point, the district would develop still further."³ His policy of expansion as demand warranted it, and economic fares, was constantly under the attack of the councillors. Between October 1927 and April 1928 there were nine motions for fare reductions; in 1929 there were at least six. In 1931 Treasurer Harvey warned the council that if the system of fares were to be based on the convenience and wishes of those in each councillor's ward, then the

¹ TCM 3.2.1927.

² GM Report TCM 30.6.1927.

³ GM Report TCM 3.5.1928.

undertaking would be impossible to manage.¹ Only after an area had exhibited building activity did the manager suggest expansion, as outwards from Costorphine in 1933, and indeed, in 1934 one of the few speculative additions was made when the route reached the Maybury Roundabout in anticipation of private building, but only after feuing had been completed.² By the outbreak of war the extensions to Fairmilehead and the Glasgow Road had raised the route mileage to its maximum of 47.25.

In general, interwar tramway expansion was into those areas showing private building development; the council's housing estates, on the other hand, through being sited on cheaper land distant from the recognised tramway catchment areas, such as Lochend and Restalrig, and later at Craigmillar/Niddrie and Pilton, these areas provided a small and growing transit demand which was easily met in the first instance by motor buses, and certainly, in their infancy, did not merit tramway links. The relative remoteness of the housing schemes raised their initial capital requirement for transport; instead of considering a half-mile extension, these areas needed two or three miles of new route, and a route, what is more, being served by public transport anyway in the form of buses.

¹ Scotsman 31.7.1931.

² TCM 11.1.1934.

The choice of public service vehicles for these areas revolved around the willingness of the council to risk capital in a project with a long-term gestation period. Housing schemes, by the 1930's, were recognised as throwing up special problems connected with their physical isolation and their residents' inadequate incomes. In 1933 the council were disillusioned with outskirts development, and the building of tramlines to connect such areas would commit itself more firmly to a policy it deemed unsatisfactory. The council realised that its central dwellers were so "because of the peculiar attractions of the district to them primarily in relation to the occupations of the working members of the household," and from this, central rehousing was seen as best; wherever demolition and slum conditions existed "theoretical ideas about density ; should not prevent as large a number of persons as possible being rehoused in the area always assuming, of course, that there is adequate provision of light and air and sanitary conveniences."¹ Such a statement is tantamount to condemnation of the city's transit facilities. New services had been introduced into Pilton, Craigentenny and Northfield, but bus fares remained high by tramway standards, and moves to bring them down into line in 1935 were firmly quashed on the grounds that buses must pay their way.²

¹ Report on Slum Clearances 1930 Act TCM 27.7.1933

² TCM 31.10.1935.

It would appear that social considerations were being placed second to the financial integrity of the transport department, even to the extent of suggesting the more expensive policy of central rehousing. It was not fully realised that the housing developments of the interwar years had drastically altered the demand structure of public transport, and that any comparison with pre-1919 operation was quite fallacious and meaningless. To meet the 'peaked' demands of the housing estates with buses may have relieved capital indebtedness in the short run, but it led to wasteful duplication of services and higher working expenses. The fact that the tramways paid rates and taxes to the value of £59,000 in 1938/39 while buses paid nothing made cost comparisons inherently biased towards bus operation; and more important, the lack of competition meant that the better quality of service provided by the tramcar went unappreciated. In 1927 it was decided to maintain Tramway Sinking Fund contributions at that year's level rather than let them automatically reduce themselves, in an attempt to write off debts while the going was good; such a move increased later years' capital expenses and also implied lack of positive attachment to the system. Could then a tramway network have fulfilled the functions performed by the mixed tram/bus system of 1939?

In that year there were 47 route miles of tramway and 70 route miles of bus services. Total revenue was £1,161,423. The fact that 13 miles of bus route followed tramlines reduced the composite transit network to 104 route miles. The largest bus sat 54, and the tramcar 62, thus for an equivalent service, the 7,595,310 bus miles run could be replaced by 54/62 of this, or 6,615,270 tram miles. When this is added to the actual tram miles run, the total system miles run is 20,345,657. Strictly comparable tramway working expenses i.e. minus rates and taxes, was 9.383d/cm giving a total working expenditure of £795,430. However, bus costs did not cover road maintenance as the tram figures did, and in addition, the buses did not pay for wear and tear of the roads they in fact caused. A report of 1916¹ estimated such charges at £380 per mile per annum, which would be roughly the same at 1939 prices. The bus had a hidden road maintenance charge of (57 x £380 per annum) or £21,660. Since this is already included in the tramway expenses, we can deduct it to get the overall, comparable working expense of £773,770.

Total revenue was £1,161,423, which leaves a net balance of £387,653 capital charges. On 104 miles of track, this provides a capital charge of £3,727 per mile per

¹ Report upon the Tramway System of the City of Edinburgh
October 1917 op cit p 18.

annum, a perfectly adequate reserve considering the rural nature of some of the routes and bearing in mind the fact the overcautious Corporation was setting aside £4,040 per annum. The middle 1930's was a period of low interest rates, allowing the local authority to borrow at 2%, which gives an all in capital charge on a £30,000 mile of track with a life-time of 15 years of around £2,300 per annum. In the 1940's Glasgow Corporation's charges for Sinking Fund, interest and depreciation amount to only £2,150 per mile,¹ or nearly half the Edinburgh charge. Using £2,300 as a realistic charge leaves a net profit to the undertaking of £94,453, and if we include rates and taxes of £72,189, the surplus is £22,264. Actual net profit in 1938/39 was £13,005. The city was being forced into accepting second best because the council's lack of commitment was grossly inflating tramway capital expenses at a time when such money was unprecedentedly cheap. The duplication of bus/tram routes and bus routes themselves meant that only a total overview of the system could appreciate the density of permanent way useage and produce true capital charges.

Obviously we are not arguing for a total tramway network in 1939; the optimal policy would place buses on the rural routes and cross termini roads. But we have

¹ Glasgow Corporation Tramway Accounts

shown that the financial approach to the system in the interwar years was wrong. The fear of being burdened with an expensive and obsolete transit system, a fear -stimulated by the economic conditions of the late 1920's and the rapid rise of the motor omnibus, and a fear made more real because the Lord Provost of the mid-30's was chairman of the Scottish Motor Traction Company, the largest private bus fleet in the area, such a fear expressed itself in timid expansion policies where the short-term was all-important and the correct criterion of applying a system overview was sacrificed to one of looking at every extension in a vacuum. No new routes were built by the tramway department, only bit-by-bit extensions to existing lines, with little attempt to serve housing estates, save Saughton which happened to lie just at the end of a tramline.

The 1939-45 war pushed the operating costs up for trams and buses, but the former suffered also from an inability to maintain permanent way because of material shortages. Increased fuel and maintenance costs had more impact on the buses, raising their working expenses/mile from 9.75d in 1939 to 15.285d in 1945. For the tramcar the rise was from 10.429d to 15.22d. Labour costs accounted for most of the increase, but these were to be insignificant compared with postwar pay awards. By 1952 bus working expenses were 22.618d and tram costs 23.491d. The cost differential between the two vehicles was still much the same.

It was in the early 1950's that the major vehicle policy decisions had to be faced. Permanent way required a vast amount of renewal, and the question was asked whether the money might be better spent simply buying more buses. In October 1950 the council decided to scrap 25% of its tramcars to give those remaining a better lease of life. Only 56 tramcars were newer than 1935,¹ and this in itself was to cause much trouble. Although the council might have looked after the permanent way in exemplary fashion, the 'square wheels' of these old trams quickly ruined track. The 1950 decision was to give more time for a cool consideration of the issue. Most people favoured the move; "it is prudent that the matter should be approached cautiously."² The main pressure for outright abandonment came from the Progressive group in the council.

Only two years later, on September 25, 1952, the council decided to scrap the tramways by a majority of 31 to 21, the vote going on party lines. The manager showed the expenses of the two vehicles (already quoted) but no mention was made of their different carrying capacities. To re-equip the tram fleet and renew the track would cost an estimated £2.35 millions; to convert the system

¹ Scotsman 13.12.1950. ² ibid 3.11.1950.

to buses would cost £1.85 millions - enough said. But only a fortnight before,¹ the manager had stated that bus capital was depreciated over ten years with a physical life of fifteen years while tramway capital was discounted over twenty years with a physical life of thirty years. The resultant annual capital charge, based on either the accounting or economic life of the two systems, was lower for tramways than buses.

The opposition pointed out that since 1942 £48,000 had been spent on tramcars and £750,000 on new buses. Since 1942 the tramways had paid income tax amounting to over £1,000,000, some appreciable percentage being incurred by the bus fleet. It must have been on this basis that Councillor Campbell claimed that in the post-war years the tramways had subsidised the buses to the tune of £455,000. Whether this is the correct figure or not is not too important, but his conclusion is relevant; "it would seem that if the surpluses made by the trams had been expended on that system there would have been no necessity to call on borrowing power for tram renewals."² The Convenor of the Transport Committee could only agree to this fact, but defended the conversion decision

¹ TCM 9.9.1952.

² Scotsman 26.9.1952.

because he was unwilling to commit the city to a tramway system for the next twenty years.¹ This would appear to be the only logical explanation for replacing a system which carried 163.5 million passengers in 1952 and lost £33,000 by a system which carried 108 million passengers and lost £66,000. In an age when petrol prices were rising and future fuel supplies were uncertain, the Corporation went for the bus because it offered the more short-term commitment; the bus was not more efficient, or more comfortable, or wanted by the ratepayers.²

The reason for the decision can be discerned in the party split of the vote. The Progressives wanted trams scrapped, and Labour wanted them retained. It was the affluent council majority which got its way. The wards whose councillors unanimously voted against tramways were Murrayfield-Crammond, Costorphine, Colinton, Calton and Craigentenny; those wards voting totally against the move were Holyrood, Sighthill, Pilton, Central Leith and Craigmillar.³ This middle class/working class division is further highlighted by the deputations received in favour of the tramways from Edinburgh and District Trades Council, the Edinburgh City Labour Party,

¹ loc cit.

² A public meeting was held in the Gorgie/Dalry ward seeking a public inquiry into the decision see Edinburgh Evening News 23.9.1952.

³ TCM voting list 25.9.1952.

and several housewives' associations. The issue had resolved itself into a private/public transport debate, with the private transport protagonists in charge of the council.

In 1938 there were 17,245 cars registered in the city, and if one accepts that there were no moves to scrap the tramcar then because road space could cope with this number, then we should not expect any scrapping demands until this number was exceeded. This did not happen until 1951.¹

The last tramcar ran on November 16 1956, and it cost the citizen more than a nostalgic tear. Average fare per passenger on the cars of 2.708d was replaced by the bus fare of 3.233d. The passenger had to pay a surcharge of 20% for the privilege of riding in vehicles more amenable to private traffic flow. Such a charge increase discouraged short-distance travellers, and so aggravated the other problems facing transit undertakings in the later '50's. The first year's operation by the bus fleet experienced a drop in passengers: "Short distance traffic has declined: there is a greater tendency for persons

¹ There were 17,053 cars registered in the city in 1950, 17,642 in 1951, and 18,686 in 1952. It is impossible to correlate councillors and car owners.

to stay indoors in the evening, with the advent of television, and there is of course the steadily increasing competition of the private car."¹

Private transport competition increased in the 1960's, but public transport was ill equipped to fight back. Its compromising attitude in the early 1950's had left it open to abuse later on; it had accepted the car as the rightful heir to the city streets, and countered falling demand with cuts in service and increases in fares. The whole situation derived from the 1920's, and was the result of a council attitude still present in the '60's; no-one was totally committed to efficient public transport, because, of those in charge of council affairs, no-one was totally committed to using public transport.

¹ GM Annual Report 31.8.1957.

Appendix 5.1

The death of the Edinburgh Street Tramways Company and
the rise of Leith Corporation Tramways Department
1894-1920.

On December 9th 1893 the company handed over to Edinburgh Town Council its lines within the city, being left in turn with the system in Leith and the isolated Portobello route. In the following year Dick Kerr ceased their through¹running arrangements at the Pilrig boundary: they were willing to let the cars cross but insisted on men and animals remaining within their operational areas; the company suggested that only the conductors be changed, thus speeding up the crossing while safeguarding their respective fares. On arbitration, both men and horses had to be changed, resulting in time loss and consequent drop in passenger usage, which hit the smaller company more severely. The directors saw the move as one designed by Edinburgh Town Council to highlight to the Leithers the disadvantage on non-amalgamation with the city.¹

In 1897 the company decided to sell out, and had arranged a price of £40,000 for the Portobello section (which, due to the recent acquisition of the burgh by Edinburgh

¹ Scotsman 30.7.1896.

was now within the latter's area) and £57,000 from Leith. The deal seemed so final that Edinburgh and its lessee drew up another lease, starting from this time so that the anticipated system would operate under one time expiry date. The deal, however, collapsed because the opposing councils were unable to agree on how the lines should be run. On June 30th, 1898 the Portobello section was sold off to Edinburgh for the agreed amount. The company now started building the Newhaven section as settled between council and company during the 1891 purchase negotiations. The loans incurred in this construction, bad weather, rising fodder prices, and the "Pilrig muddle" began to take their toll, and the company started making losses from 1900 onwards. The cabling of the Edinburgh system made the boundary break complete since passengers now had to change cars at Pilrig; in December 1898 the company's Leith Walk cars earned 11.22d/cm, and in 1901 the figure had dropped to 8.17d/cm.¹

By 1902 the shareholders were pressurising the directors to sell, and in October 1904 Leith Town Council obliged, paying £60,000 for the 6.5 miles of route. The company had failed because the demand in this working class section of the Edinburgh conurbation was below average: in 1900 Edinburgh Corporation lessees faced a transit need of 1.3 million journeys per route mile per annum; the

¹ ibid 31.12.1901.

United Kingdom average was over 900,000; the Leith demand was just over 650,000. That the system was still based on horsepower in 1903 placed the undertaking under both revenue and expenditure restraints only surmountable by electrification.

Under Leith Corporation ownership the system was electrified and formally opened on November 3 1905.¹ The flatness of the port area allowed the Corporation to boast one of the lowest working expenditures in the country, and under this advantage the undertaking operated until amalgamation in 1920.

¹ ibid 2.11.1905.

Chapter Six: Glasgow

" . . . the great wide stream of city life is the tramway Pactolus, from whose auriferous banks the golden grains are daily gathered."

"Our Tramways" 1909 p 12

Chapter Six

It is fitting for a city which took 'the caur' so much into ~~its~~ tradition that it should make its acquaintance with the tramcar at an early date. In July 1860 Glasgow Police Board received two applications seeking powers to lay tramlines in the city. George Francis Train was behind the venture known as the Glasgow Street Railway Company Ltd,¹ and the other, the Glasgow Street Transit Company was probably backed by G B Bruce of London. Train offered to build lines in the Trongate and Argyll Street district and remove them if told to do so; the second company sought only general powers and stipulated no specific route network.² The Police Board let the issue hang whilst following the trials in Birkenhead and London. Their reluctance to commit themselves meant that the schemes came to naught under the adverse comments and litigations which were to emanate from the metropolitan tramway incidents of 1861. Nevertheless, in the following year the Board itself acquired the right to construct and operate tramways should future developments make them technically acceptable.³

¹ Minutes of Glasgow Police Board. 30/6/1860

² Ibid 3/12/1860

³ Glasgow Police Act 1862. Clause 318. See also Select Committee on Tramways Bill PP 1870 Vol 10. Q 681

Morton Coates Fisher and Dilwyn Parish, two of Train's associates, returned to Glasgow in 1869 and again sought tramway construction powers.⁴ Their proposals, in the form of the Glasgow Tramways Bill, were quickly followed by the counter proposals of the Morris syndicate. At this stage the local authorities took fright; things were moving much too fast, and there was, as yet, no general act to serve as guidelines for the control of such enterprises. The authorities considered it best that they retain overall control of their streets and with this intention they successfully opposed the bills in Parliament in February 1870.

The two schemes had little future acting against each other, and the council had no plans of its own, and so it was in everyone's interest that the promoters and council get together. The promoters agreed to pool their proposals and it was decided that within six months of their composite bill becoming law the Corporation could step in and take over all the construction and ownership rights and lease their tramways to the original promoters. At this stage the city's major omnibus proprietors, Andrew Menzies and John Walker, threatened serious opposition, and as a result of the effectiveness of such pressures in Liverpool in 1868, they were brought quickly into the negotiations.⁵

⁴ Minutes of Glasgow Police Board. 11/10/1869 and 25/10/1869

⁵ Town Council Minutes (TCM) 29/9/1870

The Glasgow Street Tramways Act was passed in August 1870, and by September the town council had decided to build the lines.¹ It paid the promoters £7,200 to cover the costs they had incurred in securing the act. In the following year the promoters set up their leasing company, the Glasgow Tramway and Omnibus Company Ltd.² As in Edinburgh, Fisher and Parish had been bought out by this time, but in a rather complicated financial manoeuvre. The Fisher-Morris alliance had previously proposed a joint company for the city with an initial capital of £200,000, and the British and Foreign Tramways Company had acquired all the shares and was now offering them to the public as the above named tramway company. The British and Foreign Tramways Company had Morris, Sheldon and Rose on its board; the Glasgow Tramway and Omnibus Company had the same directors and the American faction had retired, no doubt amply compensated by the profits made by the British and Foreign on the flotation of the local company. The British and Foreign bought out the omnibus competition in the city, provided the local company with 200 tramcars, 50 buses, 2,000 horses and £60,000 of heritable property in the city, and in return the Glasgow Tramway and Omnibus Company bought the

¹ Agreement between the Town Council and the promoters of the Glasgow Street Tramways Bill and Glasgow Tramways Bill.

30/6/1870. Corp. Archives DTC 14.3.59

² Scottish Records Office File No BT2/367.

former's lease for £350,000. This price was later reduced to £315,000 but "even as modified, the arrangement paid the astute financiers who proposed it uncommonly well, the real value of the assets handed over being £165,000"¹. The London tramway ring had netted £150,000 clear profit, and British and Foreign's dividend for 1872 was 39%. They also left the local company with very onerous lease conditions. The company had to pay the town council interest on its expenditure on tramlines, 3% per annum of this amount for a sinking fund, 4% per annum to a renewal fund, and £150 per annum wayleave per route mile should dividends go above 5%. In addition the corporation ensured that the company remained in the city by demanding it hand over £60,000 heritable property within the city to be held by the corporation as surity; £20,000 had to be handed over immediately as a guarantee to their taking up the lease when the first lines² were ready for use. It was no coincidence that by 1875 only one of the directors who had negotiated the lease still sat on the board.³ Those who had retired had achieved their own ends through the British and Foreign deal and the Parliamentary expenses.

¹ The Official History of the Glasgow Tramways and Omnibus Company Ltd. 1871-1894 p4

² Lease agreement between the council and the GTOC. Corp Archives DTC 14.3.59 16/17/11/1871

³ Company meeting report in the Glasgow Herald (GH) 24/8/1875

The operating company had just been floated when the corporation was threatened by more competition. No fewer than five promotions were proposing to lay tramlines in the suburbs of the city; London and American businessmen may have introduced the tramcar to Glasgow, but it was local men who were now trying to exploit it. The Glasgow and District Tramways bill, the Glasgow and Suburban Tramways bill, the Glasgow and Monklands District Tramways bill, the Glasgow, Coatbridge and Airdrie Tramways bill, and the Glasgow, Bothwell, Hamilton and Wishaw Tramways bill - all these schemes threatened the corporation's planned control for its intended transit system, and the corporation could counter the moves in only one way. It introduced its own extension proposals and in the ensuing Parliamentary Committee stages all the bills save one were dismissed, much to the pleasure of the corporation whose extensions had been submitted "for purely protective purposes".¹

September 1871 saw the corporation start the construction of the tramlines, and on August 19, 1872 the first line was opened. It ran from Great Western Road to Eglinton Street. By 1876 the first phase of line building was over and there now existed a tramway system of some fifteen miles which radiated from the city centre to Whiteinch, Kelvinside, Dennistoun, Bridgeton, and Queen's Park.² The

¹ Report on Parliamentary Proceedings to Tramways Committee.
Tramways Committee Minutes 14/6/1872

² For exact opening dates see C A Oakley The Last Tram 1962

Corporation Tramways Act of 1875 attempted to join up the loose ends of the system, but in its passing it met the opposition of the Glasgow Tramway and Omnibus Company and several adjacent local authorities. The Commissioners of Police of Crosshill and Hillhead sought the right of purchase over those lines proposed to be built in their areas since many neighbouring authorities feared that Glasgow was throwing out such tramlines in an attempt to provide later justification for municipal amalgamation. The Parliamentary committee dismissed their appeals, but Glasgow was still very annoyed. Its representatives at the hearing were concerned "that in a matter so vitally affecting the convenience of Glasgow and especially the suburbs, as the establishment and maintenance of an efficient system of tramways, the existence of little subordinate jurisdictions with what is to all intents and purposes one great city should render such opposition possible".¹ The tramway company's case was more difficult to reconcile. For some time the company had been seeking to by-pass its penny-per-mile fare commitment and hit on the idea of suggesting that it charge a penny per route mile rather than a penny per passenger mile. It planned to divide its routes into well marked mile sections and then charge the passenger a penny for every section or part thereof through which he travelled. In the 1875 bill

¹Report on the Deputation for the 1875 Bill. TCM 27/4/1875.
See also G Best The Scottish Victorian City Victorian Studies
Vol 11 March 1968

the corporation sought to legalise their position as the prime decision taker in such matters, but the Parliamentary committee allocated equal rights between the company and the corporation.¹

In July 1875 the company produced its new fare schedule proposals; there were to be short-distance cars, ordinary cars, and white through-running cars aimed at ensuring seating capacity for the suburban commuters.² The through-cars were to have a higher fare and the routes themselves were to be divided into the one mile sections. The citizens were none too keen on the plans: why should suburban non-city dwellers receive such preferential treatment from a municipal undertaking . . . "through cars would be a convenience to the wealthy".³ However, the company had the right to implement its plans, and its schemes, initially developed to overcome its unrealistic fare commitments, were brought into being. The policy had its desired effect as revenue per mile rose from 15.25d in the second half of 1874 to 16.25d in the latter half of 1875 with the result that the company was able to pay out its first dividend since 1872.

In the ensuing years the council was petitioned by residents' groups for tramway links. Demands came from

¹ 1875 Bill report *ibid*

² Tramways Committee Minutes 18/8/1875

³ GH 3/12/1874

Shawlands and Strathbungo in August 1876, Maryhill in August 1877, Parkhead and Shettleston in November 1877. The company was unwilling to approve of such extensions because of the nature of their lease, but willingly agreed to the corporation's extension proposals once the lease terms had been modified in the company's favour. From March 1879 the company had their renewal and sinking fund payments on future lines dropped, the only rental on these being 4.5% per annum on the capital expended.¹ This left the way open for system expansion, and under a welter of residents' demands, the network grew to 24 route miles by 1882. The council heard petitions for transit links from Kelvinside in June 1878, Dalmarnock in November 1878, Cowcaddens in July 1879, Pollockshaw and Shawlands in September 1880, and Partick, Hillhead and Kelvinside in January 1881. The route extensions took termini into Maryhill, Rockvilla, Parkhead, Dalmarnock, Hutchesontown, Crosshill and Shawlands; those who sought tramways received them.

Late in 1884 the Patent Cable Tramway Corporation approached the council with suggestions to lay cable links along Parliamentary Road and Springburn Road. The existing lessee was unwilling to operate such a line without an extension to the lease. Early in 1885 another promotion, the Glasgow Central Tramways Company proposed routes in

¹ Agreement between the council and the GTOC Archives DTC
14.3.59 6/8/March 1879

the west central area of the city but the council veto prevented its fruition. In true style, however, the council returned to Parliament later in the year with a bill to build both sets of line proposals.¹ The company managed to reduce its financial commitments on these latest additions; the Bothwell Street-Woodlands Road route would pay only 4% on its capital, and the same applied to the Springburn route but here company opposition managed to rule out the power of mechanical working sought by the council.²

By 1886 then, the system as run under the lease arrangement was virtually complete with minor sidings and stable connections raising the total coverage to 34 miles by the end of the leasing agreement in 1894. The town council had consistently followed an aggressively municipal line by answering any impending competition with like proposals. They practised the strategy of taking out extensive line building rights with the intention of returning to Parliament in later years for time extensions or abandonment powers once the threat had dwindled. This may have defeated opposition but it also meant that ratepayers could demand that such strategic line powers be

¹See for example the Tramway Committee Minutes for 7/10/1884 and 21/10/1884

²Company meetings reported in GH 16/7/1885 and 16/7/1886

implemented as in the case of the Dalmarnock line, authorised in the 1879 Act, and the council had little reason to refuse. Moreover, the rental from its lines encouraged the policy of expansion where social needs rather than economic returns appeared to be the decisive factor. The profitability of the system from the council's point of view - by 1894 the tramway paid over £63,000 into the Common Good Fund - fostered the philosophy that transport was a social service. "It was settled by the general consensus of public opinion that this enterprise, which was primarily municipal because it ran through the streets and conveyed the citizens, should be municipalised and carried on, if not at a profit, at least at the convenience and benefit of the whole city."²

For the Glasgow Tramway and Omnibus Company Ltd, the council policy was an expensive way of preserving and operating monopoly. However, the onerous terms of the initial lease allowed room for further negotiation between the two parties which allowed line extension to be traded off against decreased rentals.

The company itself had its own serious internal problems. Shareholders realised quickly that the penny fare clause

¹ Tramways Committee Minutes 31/3/1881

² GH 13/11/1891

meant that they were the ones paying for a lease which was not only expensive to honour, but which had been very expensive to obtain. Their awareness of London speculation made them hyper-sensitive to foreign interests. The first company meetings were held in London and its major shareholders at the outset included H G Erichsen (1250 shares), L Floersheim (1200), W Morris (1100) - all directors of the British and Foreign Tramways Company, and many other London businessmen. By the later '70's it was the practice of the managing director to give the breakdown of shares by country: in 1878, for example, 21,000 shares were held in England and Wales, and 14,000 in Scotland with less than half of the latter held in the Glasgow area.¹ The average Glasgow shareholding was just over five shares, and this small shareholding minority looked on its principals as "strangers and foreigners coming in and trampling upon the people of Glasgow".² The company's fare policy showed a certain distance of command in dealings with the council, and the issue was brought clearly into the open during the 1874 tussle between the company and the proprietors of Buchanan Street. The shopkeepers decided against their street being connected into the system contrary to the plans of the 1870 Act, but the company held the council to their commitment with their agent stating that "the majority of the directors are of the opinion that this

¹ SRO File No BT2/367

² Company meeting reported in GH 8/2/1876

route down Buchanan Street is, next to Argyll Street, the most valuable part of the lease, and they do feel very great difficulty in seeing how they can go to their shareholders and tell them that 'pro bono publico' you must abandon this route, you must give it up for the benefit of the citizens of Glasgow . . .¹

Internal criticisms of the company's anatomy waned as dividends increased. They rose from 3½% in 1875 to 11½% in 1882 and hovered around 8% for the rest of the 1880's.² The company's rent to the council rose gradually from around £10,000 in 1875 to just over £30,000 in 1894. This was equivalent to a capital charge of 1.75d per mile run in the 1880's. Earnings per mile run fell throughout the decade 1878-88 (see Fig 6.1). Route expansion resulted in falling revenue per car mile as these lines were slow to generate business,³ and it was not until the system was consolidated after 1886 that earnings picked up. Only the concurrent drop in fodder prices prevented the company from facing financial difficulties. From 1876 the cost of feed per horse fell since the price of their Indian corn dropped from 25/- per 280 lbs in the '70's to 9/9d in 1894.⁴

¹ GH 17/1/1874

² Company reports in GH 27/1/1885; 1/2/1887; and 31/1/1888

³ Company meeting reported in GH 16/7/1885

⁴ Official company history op cit

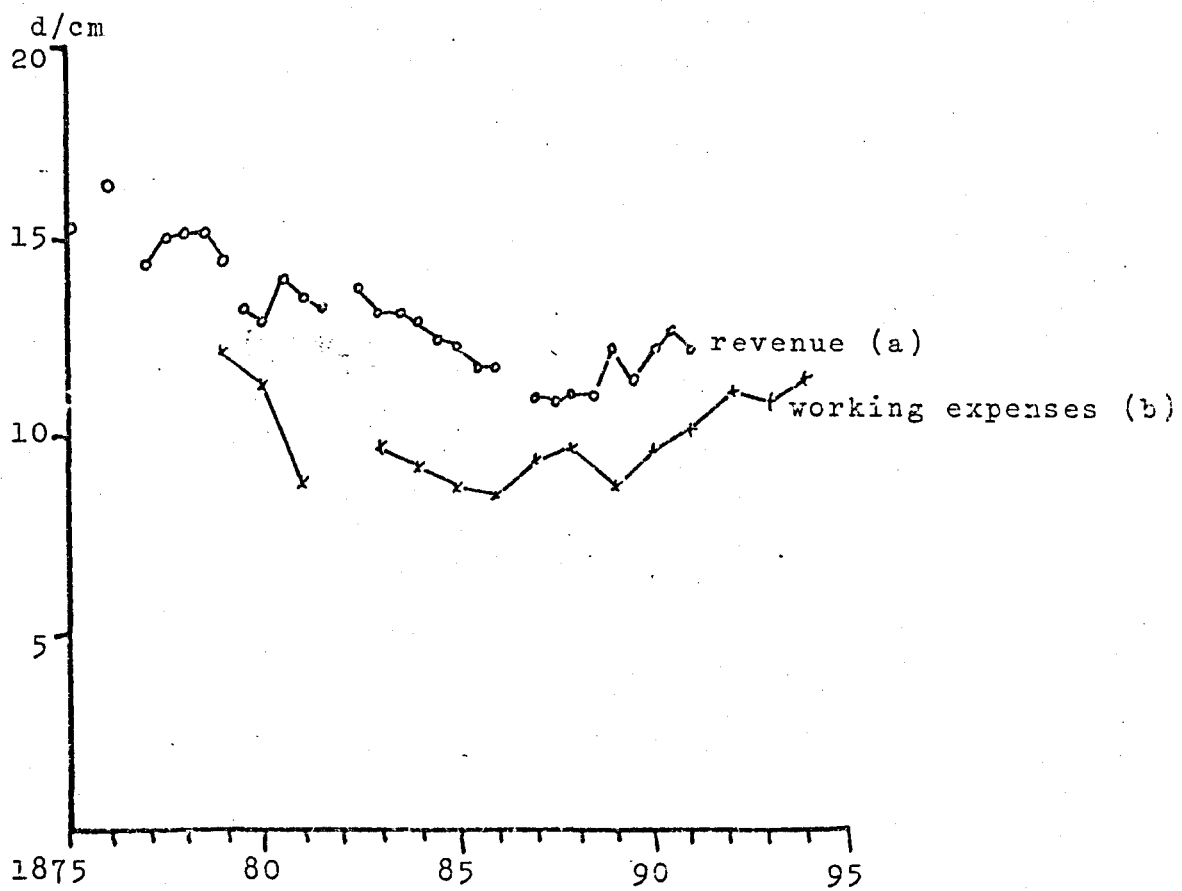


Figure 6.1. Glasgow Tramway and Omnibus Company: revenue and costs 1875-1894.

Sources: (a) company reports
(b) Board of Trade Tramway Returns

On capital account the new rentals were very much in the company's favour. In all, rent, sinking fund and interest obligations averaged £30,000 per annum in the '80's on a corporation investment of just under £350,000. The rental was thus in the region of 8.5% per annum which is equivalent to track life of twelve years. In other words, after the 1879 lease rearrangements the company was paying an economic rent which allowed its dividends to increase markedly from 1880 onwards. Since the company's own assets covered only cars and horses, and since its capital charges and working expenses were of average proportions, then the company could distribute high dividends from a low capital base. Even with its grossly inflated share issue of £350,000, in terms of capital investment per route mile this comes to £11,300 compared with the national average of £14,700 in 1893. In fact, after 1879 the corporation was subsidising the company quite significantly in that it was looking after at least 75% of the latter's necessary capital equipment (ie track) at cost price.

In terms of patronage, the company faced a growing demand and trips increased from 1.8 million in 1875 to almost 54 million in 1894, with only the period 1885-87 showing falls. The trade depression of 1884/85 and the opening of the suburban railway in 1886 explain the set-backs, yet the company's own analysis of the extent of the trade depression on patronage is somewhat curious. The chairman in 1885 explained that the current drop in passengers was

due to the depression "especially among the wage-earning class who furnish our principal source of revenue".¹ Since the drop in trips between 1884 and 1886 amounted to only 2 million, or 4.7% of trips made in the former year, it is difficult to accept the chairman's ideas as to who used his tramcars. Probably the fact that this element of demand required transit facilities at set and definite periods of the day exaggerated their apparent dependence on the system and vice versa. (See chpt 7)

Late in 1889 the company and the corporation started their lease extension negotiations, and one thing that was certain was that the public were not willing to accept any arrangements with the present lessees " who have always made the public convenience and the public sentiment quite subsidiary to the pursuit of profit, and that is what the citizens are not disposed to tolerate any longer".² The trade unions of the city seconded this opinion and emphasised in particular the company's harsh treatment of its employees.³ Just as the unions pledged, the lease negotiations became a major issue in the local election-eering of the following years. The company did not take

¹ Company meeting reported in GH 16/7/1885

² GH 30/11/1889

³ North British Daily Mail 21/9/1889

this opposition quietly. It reacted quickly and aggressively by changing its articles of association to allow it to undertake omnibus operation, and then told the corporation that if its lease were terminated it would run a fleet of buses in direct competition with the tramcars. Nevertheless, the new council of 1891 carried out its election pledge and voted to take over the tramways and run them under the powers vested in it under the 1870 act.¹ By April 1892 final consultations over the purchase of the company's stock broke down and the corporation answered the company's competition threats by refusing to purchase their redundant-to-be tramway-rolling stock.²

Throughout the negotiations both sides has shown great awareness and concern for future methods of traction. In 1890 the company sought powers to use electricity in a bid to lure the corporation into a renewal of the lease,³ and the corporation in turn offered the company a five year lease system so that new terms could be arrived at easily should future capital demands change in the light of new technology. The corporation itself was au fait with current electric traction applications since it had studied in depth the accumulator cars, compressed air

¹TCM 12/11/1891

²Tramways Committee Minutes 13/5/1892

³Company meeting reported in GH 25/10/1890

cars, steam cars and the new overhead trolley system in Leeds.¹ However, on the eve of municipal control the corporation (and the company) considered electric traction to be not quite fully developed; its inability to carry passengers on the top deck increased an already high dead weight to passenger capacity ratio. Estimates of costs in 1892 put a mile of overhead trolley system at £10,000, while the equivalent horse tramway investment was £5,000,² and for this reason the corporation instructed their tramway manager in October 1892 to investigate the feasibility of converting the system to cable traction. The lack of experience in working and maintaining electric tramways in Britain led the corporation to play a waiting game and so when the municipal tramcars took to the streets on July 1st, 1894 they were pulled by a stud of over 3,000 newly-acquired horses. It had been thought better that the municipal management get experience of tramway operation and defeat the omnibus opposition from the Glasgow Tramway and Omnibus Company before embarking on the risky policy of electric conversion.

¹See council reports: Working of Tramways in England 26/9/1889 DTC 14.1.21/603; Working by Electric or other Motive Power 3/10/1890 loc cit/689; Interim Report on Mechanical Haulage 5/10/1891 DTC 14.1.23/397; Working Cost Estimates Jan 1892 Loc cit/401

²See report number DTC 14.1.25 / 395 13/12/1892

In 1896 the general manager visited numerous tramway undertakings at home and abroad and returned convinced of the superiority of the overhead system, but he was also aware of the condition which had to prevail if success was to be ensured. "The problem is not simply one of less cost per car mile for working, but also of running more miles per hour and increasing the earnings by the smarter service."¹ His recommendations, plus those in the report of a Glasgow Herald journalist on the American tramway scene², and the growing deluge of plans and estimates which the corporation were receiving from such organisations as Siemens Brothers and Graff-Baker in 1895 and the Electro-Magnetic Traction Company and the Simplex Syndicate in 1896, led the tramway committee to authorise an electric traction experiment in April 1896. The press were in favour of the trial but voiced a certain reserve; the system was "not an ideal one" but it had "been clearly enough brought out that it is the best in the market for our purposes".³

The contract for the Springburn electric tramway went to the Westinghouse Company, and the service started

¹ General Manager's Report on Mechanical Tramway Motors

April 1896 DTC 14.1,27/54

² Glasgow Herald Reprints Tramway Motors: Lessons from America Oct/Nov 1896

³ GH 10/4/1897

operation on October 13th, 1898. By December the line had proved itself with working expenses of 6½d per car mile, 2d less than horse costs, and its estimated earnings were over 2½d per car mile higher than the existing services.¹ The Tramway Committee decided the whole system should be electrified with the aim that conversion be completed in time for the opening of the International Exhibition to be staged in the city in 1901. But total commitment to the overhead system had not been achieved: it was being installed because, compared with cable or conduit systems, the overhead trolley involved relatively little investment in power transmission networks so that if some tramway development should take place in the future then only the costs of the wires need be written off.²

With conversion completed in time, working expenses on the new electric system fell from the horse figure of 8.3d per car mile in 1898 to 5.3d in 1902 (see Fig 6.2). This saving did not go unnoticed as public demands led to fare reductions in June 1902. The penny stage fare which gave just over a mile in 1894 and which was increased in November 1896 to cover three half-penny stages, was now extended to cover four original half-penny stages. In

¹Manager's Report on Springburn Route Tramway Committee Minutes 28/12/1898

²ibid 21/12/1898

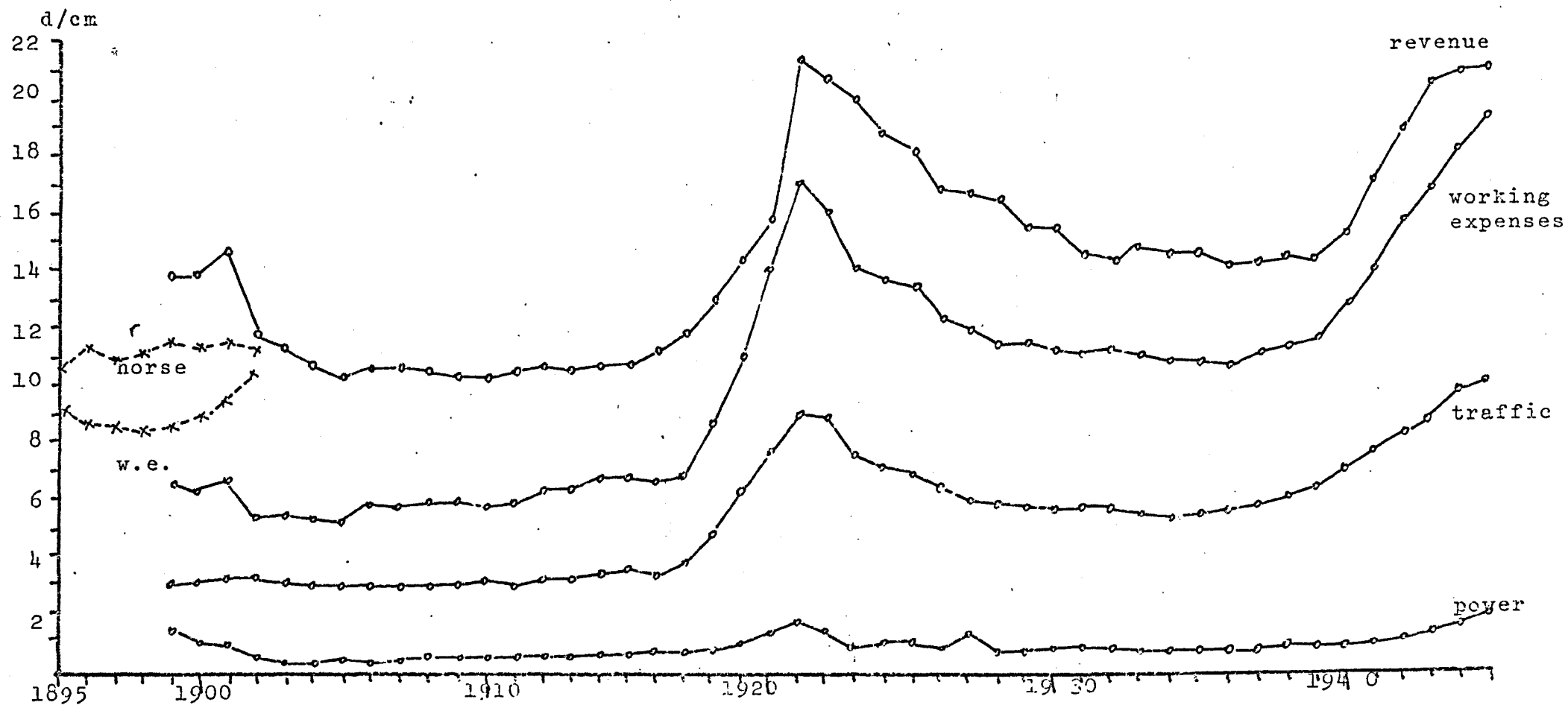


Figure 6.2. Glasgow Corporation Tramways: Revenue and Costs 1895-1945

Source: Corporation Tramway Accounts

the following year fourteen ward committees and the Women's Guild of Cooperative Societies asked the Corporation to double the distance given for a half-penny¹ but this time the general manager had their request denied. Such a fare alteration would fill the tramcars with short-distance passengers much to the disservice of the suburban commuter whilst at the same time placing the undertaking's financial standing in jeopardy.²

The reduction in fares and the reduction in costs encouraged a growing public demand for system extensions which were to accompany the Corporation's own expansionary policy aimed at defeating private enterprise threats such as it faced in 1903.³ Throughout the 1900's the corporation received deputations from various ward committees all seeking links with the city; they came from Cambuslang, Riddrie, Duntocher, Kirkintilloch, Cadder, Thornliebank, Lambhill, Newton Mearns, Hyndland, Baillieston, Coatbridge, Langside, Whitevale, Milngavie, Rutherglen, Bellshill, Provanmill . . . Pressure was persistent and continually reminded the corporation that there was ample scope for private tramway operations in the non-municipal suburbs.

¹ TCM 24/6/1903 and 19/8/1903

² Manager's Report on Halfpenny Fares TCM 31/8/1903

³ Clyde Valley Electric Power Company debate in TCM 16/11/1903
See manager's report on Extensions TCM 25/2/1908

The policy of extra-boundary expansions did raise some serious opposition. The Ratepayers' Federation considered that such lines removed "responsible ratepayers from the city into the country beyond the assessable area",¹ and some councillors feared that these rural tramways would increase the rateable value of neighbouring authorities and in turn both discourage and enable them to oppose annexation into the city proper.²

The General Manager authorised a scheme of carefully vetted extensions which increased the system coverage from 44 miles in 1901 to 98 route miles in 1911. After 1904 revenue per car mile remained stable at between 10.3d and 10.4d following the 1902 fare reductions. That this was the case despite the route extensions shows that the manager's route proposals had been soundly based. But the undertaking did pay some costs for its defensive strategy. After 1905 working expenses began to rise because of increased maintenance charges and electricity prices (maintenance and repairs shot up from 0.92d/cm in 1905 to 1.44d in 1906) and this then ensured that the system's net profit remained fairly static even although its coverage had extended and swelled the capital outlay from £2.3 million in 1902 to £3.6 million in 1914. Over the expansionary, totally electric decade of 1902-1911, annual loan charges had increased by 80% to £164,962 in

¹GH 29/12/1903; see also TCM 5/2/1903

²GH 30/3/1906

the latter year, and depreciation and renewal charges, increased by 90%, were £202,579. Income in the interim had been raised by over 60% and stood at £992,000 in 1911.¹ Contributions to a general reserve fund were suspended in 1909 when, in a slowly deteriorating situation, the Common Good donation of £50,000 to £60,000 was considered more worthy of support. In 1907 the manager emphasised that lower fares were out of the question while expenses were rising faster than income; taxes and accident insurance were rising steeply, and track maintenance had trebled between the years 1902 and 1906.² Later in the year the manager spoke out against rash extensions³ and fare reduction demands and his advice was followed by the tramways committee until 1911. That year's financial accounts showed a higher than normal surplus and a surge of local pressure forced the half-penny fare issue back into local elections. Both the Tramways Convenor and the manager protested strongly at such changes; to charge a halfpenny for a mile would hit the penny fare revenue badly since the majority of such passengers travelled for only a mile anyway and would avail themselves of the lower fare. The new town council carried out its mandate

¹ Glasgow Corporation Tramway Accounts

² Manager's Report on Fares TCM 29/5/1907; repeated in his Annual Report 3/7/1908

³ Manager's Report on Extensions TCM 16/12/1907

of "giving the commodities at cost price to the users"¹ in preference to subsidising the rates, and the tramway leaders had to accept defeat by "a force majeure, due to the currents in the upper air and also to the undertow of a strong municipal tide".²

Unfortunately for the undertaking, its professional directors were proved correct. Passengers carried rose from 238 millions in 1910/11 to 311 millions by 1912/13, but revenue rose only slowly from £993,000 to £1,070,000 whilst working expenses increased to £593,000 to £682,000. The trouble was that the increased passenger demand called for a higher density of car service to maintain revenue at lower fares. Such operations meant more maintenance and faster track wear and so led to higher expenses. By the outbreak of the First World War, Glasgow Corporation Tramway Department was financially and physically sound, but local political pressure was beginning to make this situation uncertain, and from now on the General Manager's role became that of a devil's advocate defending his network against popular cries for consumer justice.

The War and its ensuing inflation almost trebled tramway expenses; working costs jumped from 6.65d per car mile in

¹GH 8/12/1911

²J McFarlane Address to Members of the Corporation
14/8/1911 Archives C 272116

1914 to 17.28d in 1921 and over half of this increase was accountable to wage rises. In April 1919 the manager recommended a fare increase of a half-penny on every fare level. The undertaking needed more revenue but it was incapable of carrying any more passengers without requiring an appreciable investment in extra trams.¹ The Corporation compromised by implementing the fares proposals and accompanying this with a three-farthings per mile token scheme. The financial year 1919/20 witnessed the undertaking's first loss, in the order of £108,000 (net profit on revenue account was over £77,700) but in the following years the fare increases and the drop in working expenses brought the finances back into the black. While the undertaking was in this fluctuating position, the Corporation had extensions forced upon them in a bid to relieve unemployment in the area, but, as if this were not enough, James Dalrymple, the tramways manager, displayed an outrageous burst of empire-building. He recommended the absorption of the ailing Airdrie and Coatbridge system, and the likewise defeated Paisley system, into his network over the years 1922 and 1923.² There was little reason to suppose these tramways would fare any better within the larger unit, and from the point of view of the Glasgow system, their acquisition reintroduced debt

¹ Manager's Notes on Proposed Fares TCM 30/4/1919

² TCM 16/11/1921 and 24/4/1922; see also I L Cormack Tramways of the Monklands 1964

payments into the capital account and increased renewal charges for these rundown lines. (The Corporation had paid off the tramways debt in 1917, but by 1923 it stood at £1,000,000.) No doubt part of the reason for this vast set of acquisitions was the private omnibus competition which was growing rapidly at this time: a larger area of unified tramway service reduced the bus's extra-terminal attraction area. A further aggressive response to the bus came in July 1926 when the maximum tramway fare was set at 2d. If the undertaking had over-expanded in the early '20's in the face of declining passenger demand brought about by unemployment and the advent of the motor bus (see below) the decisive blow dealt to the tramways came directly from the results of the 1926 General Strike.

The strike influenced the tramways department in two ways. Dalrymple handled the reinstatement of the strikers with a manner high handed enough to earn him the name of "Glasgow's Mussolini".² In the aftermath of the strike a more left wing council came into office in November 1926 and it saw the transport department as something more than a financially remunerative municipal trading operation. Personal animosity and an inability to work with the council led to Dalrymple's resignation in the following

¹ Manager's Report on Return Fares TCM 23/9/1925

² GH 9/7/1926

month. He broadcast his grievances to the nation on BBC: "One month I am threatened with dismissal, the next month an attempt is made to amend the conditions of my appointment, the following month a motion is made that all men who lost their jobs in the general strike should immediately be reinstated. As month followed month a fresh attempt was made to upset the tramway manager."¹

With Dalrymple gone only the tramway committee convenor remained to shout out against the public clamour for half-penny fares, and in consequence, the fare returned in July 1927. This policy did increase ridership, but no revenue advantage was gained as revenue per car mile continued to fall. The new manager, Lachlan MacKinnon was less forceful and aggressive than his predecessor² and he sought in vain to have the half-penny fare abolished. The strong left wing council did not listen.³ Even with a tramway deficit in 1929 of £85,000, the committee did not relent and the manager began to despair; "Would it not be fair to give the Manager's suggestions a chance and let him be judged by the result?"⁴ An ex-convenor of the tramways committee warned of trouble ahead. He realised that the administrative decision-making procedure was too slow for

¹ Talk on BBC reported in GH 2/12/1926

² See Oakley op cit p 80

³ TCM 23/4/1928 and 19/8/1929

⁴ Manager's Report on Fares TCM 3/7/1929

for the competitive conditions of the time, and he appreciated the costs which political motives were imposing on the network through riding roughshod over the experience of the manager when he pronounced that "political stunting in transport is civic folly, for which the citizens will have to pay heavily in the ultimate".¹

The fact of the matter was that in the 1920's the tramway undertaking faced a unitary price elasticity of demand. Regardless of fare alterations revenue remained steady at £2.3 million per annum throughout the decade although patronage slumped from 447 million trips in 1921 to 419 million trips in 1927 and then picked up to 470 million by 1930 (see Fig 6.3). Over above this, income remained constant despite the addition of 37 route miles to the system and the increase in car mileage from 27 million in 1921 to 36 million by 1935. The fall in costs experienced in the 1920's as expenses per car mile were cut by 35% was swallowed up in increased vehicle mileage (25%) and capital charges for the new lines. Pandering to the short distance rider produced frequent central services which were quite unprofitable at the suburban ends of their routes. As a result the trips per car mile ratio fell from a peak of 19.25 in 1920 to an interwar nadir of 12.39 in 1932.

This disastrous pricing policy revolving around the

¹ Ex-Baillie P J Dollan reported in Evening News 24/8/1929

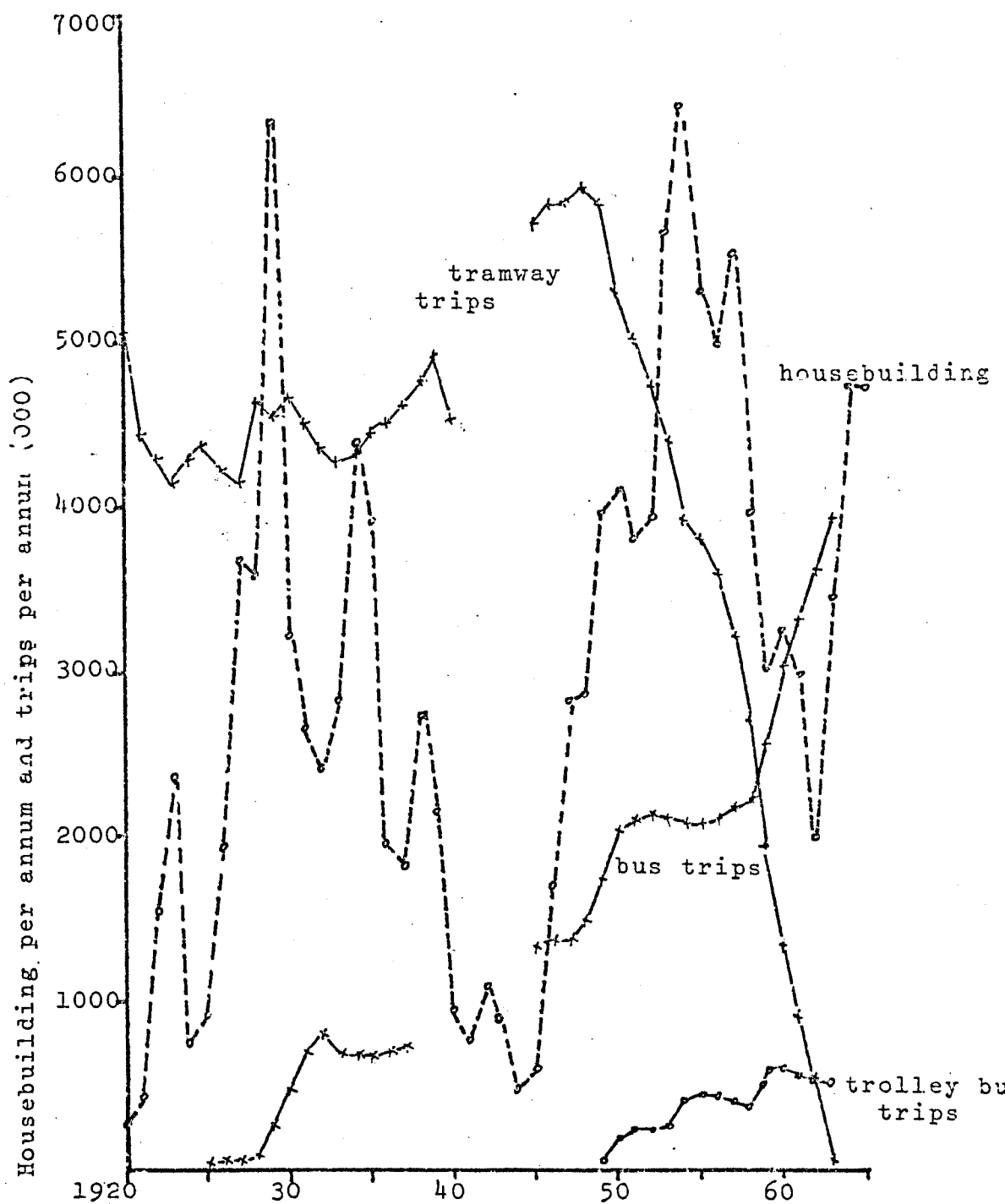


Figure 6.3. Glasgow: Mode Patronage and Council Housebuilding 1920-1965

Sources: Glasgow's Housing Centenary 1866-1966:
Corporation Transport Accounts

half-penny fare and the two-penny maximum was not the outcome of purely socialistic philanthropy since much of it stemmed from a dreaded fear of the private motor omnibus. The number of such buses running daily into the city from the surrounding areas had rocketed from 100 in 1924 to 1250 in 1929.¹ Dalrymple for his part had been content to leave the buses to their own sphere of operations because he recognised correctly that "no matter how low the tramway fare may be, they (bus passengers) will not be troubled changing vehicles. The Tramways Department need not now expect to get many people as car passengers who are going to or returning from places beyond the tramway termini".²

The council however viewed the challenge as more than a simple vehicle confrontation. To them, this was an attempt by private enterprise to muscle in on a municipal trading activity. The Evening Citizen realised quickly that the battle was to be a political one and were right to point out, albeit cynically, that for the council to kill off the bus to save its tramcars, "they would be doing a great disservice to the travelling public. But what does that matter so long as the rates are paid?"³ By 1929 this destructive strategy was under strong attack. The public's

¹ GH 18/7/1929; quoted Sir Lyndon Macassey KC

² Manager's Report on Return Tickets TCM 23/9/1925

³ Evening Citizen 14/10/1927.

concern was aroused when the council instructed its magistrates to be more scrupulous in issuing stage-carriage licences with the view to reducing their number; "Is it not . . . their (town council) duty to take a wider view of the public needs and demands arising out of transport changes? If they had been more alive to the possibilities of the 'bus', might a good deal of the traffic which has been snapped up by private enterprise not have been secured for the municipality?"¹

The Royal Commission on Transport and the Road Traffic Act of 1930 did much to remedy the problem. The Glasgow Corporation Act of 1930 gave the council a monopoly of public transport activities within its boundaries and the corporation's bus fleet of 43 vehicles in 1928 rose to 595 by 1939. Complete concentration on the tramcar in the 1920's and the total dismissal of bus operation, had made the corporation blind to the fact that much of the bus patronage was not poached from the tramcar but was based on the trips generated by the housing schemes the corporation itself was erecting on the city's outskirts. The council housing programme of 1931-35 drew out its bus route mileage from 88 to 177 while tramway mileage actually declined slightly to 133 route miles.

This period of bus investment in the mid-'30's coincided

¹ Evening Times 23/1/1927; "Wanted a Transport Policy"

with Labour's rule in the council. The bus-council house nexus made the vehicle the working class mode of transport and interest in the tramcar was only secondary in policy discussion. When bus fares were discussed the pressure groups for change came from the estates; the City of Glasgow Tenants' Association sought cheaper bus fares in 1930; the Central Council of Glasgow Housing Associations sought bus season tickets in 1931; and the Glasgow Council of Tenants' Associations sought transfer tickets and three-halfpence bus fares in 1933.¹ In September 1934 the tramway committee, against the advice of the manager, voted for bus season tickets. The Moderate Party in the council endorsed the view of the manager who saw the scheme costing the undertaking some £100,000 per annum in lost revenue. The council voted the recommendation into practice just as the Glasgow Herald predicted, because the newspaper concluded that the plan "would be tantamount to subsidising the travelling facilities of the suburban housing-scheme dwellers at the expense of the ratepayers resident in the more populous central areas of the city."²

The working class-bus and middle class-tramcar allegiances remained strong until the late thirties when growing numbers of motor cars began to extract sections of the better-off from the public transport arena entirely. The motor car in Glasgow found its champion in Baillie Victor

¹ TGM 3/12/1930; 1/7/1931; 4/10/1933

² GH 6/9/1934

D Warren who started his campaign for the introduction of trolley-buses in 1936. He believed there was "hardly a person - certainly not a motorist, and scarcely a pedestrian, who does not think that the days of the tram-car with its fixed rails in the centre of the city roadway are definitely numbered".¹ His persistence met with little success until the 1950's because the councils of the thirties realised he spoke only for the motoring interest.²

Before discussing the economic and financial results of this bus oriented expansion of the 1930's one further element of transport policy should be mentioned. In accordance with its aim of municipal monopoly the corporation bought the Glasgow District Subway undertaking in August 1923. Like the other system acquisitions of the time it was a financial disaster and made constant losses until the war years of 1942 and after. Perhaps its only moment of glory came in 1926 when it was mentioned in Parliament, but even here Kier Hardy could speak of it only as "a hole in the ground."³ Since its losses were absorbed into the transport accounts it constituted a continuous drain on the tramway surpluses of the thirties.

¹ V D Warren quoted in GH 23/5/1936

² See Dollan's remarks in GH 9/9/1938

³ Hansard 12/3/1926

The overexpansion and bus competition of the 1920's showed itself in the tramway accounts in the form of losses in 1925, 1926, 1927, and 1929. In the next decade the tramways were left to themselves with only the maximum fare raised to 2½d in January 1932. Passengers carried fluctuated between 430 and 460 million per annum and car mileage deviated little from 35 million per annum. Within this stable environment the tramways consolidated their physical and financial assets and returned net surpluses which amounted to £851,556 over the peaceful years of the thirties. On the other hand, the municipal buses rarely made a profit and much of this can be blamed on poor route planning. In serving the suburbs the buses ran over a great deal of the tramway network (around 50 to 60%) with resultant expensive service duplication. In 1934, for example, passengers carried per vehicle mile were 5.8 for the bus in contrast to the tramcar's 12.5. This low demand profile required higher fares than tramcars and reduced the cash flow to levels incapable of covering capital charges. From the inception of bus services in December 1924 until 1939 the bus operations sustained losses to the extent of £312,354 while showing only minor supluses in 1930 and 1938 (£1562 and £639 respectively).

The latest available interwar bus operating costs per mile are for 1935 when it was 10.482d. The tramway equivalent was 10.822d with a total cost of 13.8d. While operating expenses may have been similar, the higher loading

capacity of the tramcar saw its revenue per vehicle mile of 14.6d better the bus income of 11.8 even although the average bus fare was 2.1d as opposed to the tramcar's 1.16d. The financial demands of both the bus fleet and the subway during the interwar period amounted to a subsidy of £790,000 which was paid for out of tramway surpluses (which were £800,298 over the years 1922-1939). The successful tramway network of the 1930's was carrying the subway and the buses on its back yet no moves came in favour of cutting down bus operations. Undoubtedly the early '30's bus expansion to the council housing estates was correct, but by the later '30's demand was such as to make tramway expansion economic. Why was this not carried out?

The Labour controlled councils of 1933 to 1949 were in favour of an integrated transit system but it is probable that the working class dominance of bus patronage and the expensive failures of tramway expansions in the 1920's, placed tramway expansion in a dubious light although, nonetheless, minor lines were built to Milngavie and Giffnock in 1934 and to Duntocher in 1939. The councils toyed with the idea of trolley-buses but repeatedly reaffirmed their belief in the superiority of the tramcar.¹ This policy of bus expansion and trolley-bus indifference might well follow directly from the manager's decision to change over to diesel buses. In 1935 the corporation ordered the first of these vehicles and since they ran in

¹ Report on Modern Transport Methods TCM 18/11/1936; see GH 7/8/1934

conjunction with the existing fleet there emerged a surfeit of buses in the changeover period - vehicles increased from 329 in 1935 to 432 in the following year - and there was consequent pressure to have the spare capacity put to some use.

On the financial side the bus losses were masked within the composite accounts of the transport undertaking and the tramway surpluses of the 1930's allowed Common Good donations to be restarted in 1934. Since the Municipal Transport Department as a whole was in good shape the council followed the line that it was better left alone to follow its current trends in vehicle choice. In any case traffic congestion in the city centre was raising doubts about the tramcar's suitability in central streets¹ and the growing discussion over trolley-buses emphasised that by the late '30's the tramcar was beginning to lose its middle class patronage. Yet, in all, by the outbreak of the Second World War the tramcar was still the prime mover of people² and it was only the relative ease and short-term cheapness of bus route extensions which made the latter vehicle to be more the dynamic, albeit less economic, sector of the transport undertaking.

¹ Evening News 16/7/1937

² TCM 7/9/1938

As in the previous war, the 1939-45 confrontation hit the tramways badly, Wages rose and essential supplies fell. During the war the traffic bill (mainly composed of wages) rose from 6.4d/cm to 10.2d, and that permanent way maintenance only increased 1.4d/cm to 1.6d reflects maintenance foregone or inadequately carried out. Fare increases prevented the tramways from going into the red and they emerged into peacetime with a sound financial structure but with a very tired physical one. For the bus fleet, fuel rationing and vehicle requisitioning made their uneasy lot no better and losses continued to be turned in every year save 1943. Nevertheless the bus fleet did experience a bolstering shot in the arm in 1941/42 when the transport undertaking in toto was again made debt free. Over £4.5 million was transferred from the tramway accounts to the undertakings' sinking fund. The tramway debt stood at just over £3 million and the bus and subway concerns received capital injections of £1.2 and £0.3 million respectively. To the bus account this meant a capital saving in the order of £60,000 per annum (interest at 2% and sinking fund charges at 3%), and the loss of income to the tramway account was £30,000 per annum (£1.5 million at 2%).

After the war, wage rises and permanent way renewal requirements placed the tramways finances in jeopardy. Only the years 1947, 1953, and 1954 saw tramway surpluses. Two reasons account for the decline in fortunes. Fares were too low and were set 20% to 30% below bus fares, and

regardless of this, passenger demand fell away after 1948 (see fig 6.3). The important thing to read from figure 6.3 is the absence of any compensating increase in bus or trolley-bus use especially in the 1950's. The loss in custom was the outcome of some non-municipal transport phenomenon and can only be explained in terms of growing competition from the motor car and television. Because Glasgow serves such a large surrounding area its motor vehicle statistics are only useful as a rough guide for car ownership trends, but from this source it is possible to reckon that car useage overtook its pre-war level in 1951. This private transport lobby was reflected in the Progressive council of the years 1949 to 1952. In power, Lord Provost V D Warren introduced the trolley-bus into the city. He saw it as more flexible than the tramcar while still buying power from the Corporation Pinkston Power Station.¹ As part of the same movement, Warren's casting vote in April 1951 had the tramlines in the High Street removed in order to ease traffic flow.

With Labour returned to power in the council in 1952 the tramcar was again protected against strong Progressive attacks. In 1956 a motion to scrap the tram was defeated "the debate and voting were on partisan lines".² However,

¹ TCM 17/5/1949

² GH 14/9/1956

mounting deficits made the tramcar's position increasingly untenable and it became politically impossible to justify its performances especially when bus operation moved into the black in 1954. A five-year programme of trolley-bus conversion was agreed to in 1955,¹ and by 1958, when Pinkston was handed over to the South of Scotland Electricity Board, the tramcar had few supporters - it had to go.² But if the middle classes were deserting their trams for cars, a closer look at the bus statistics reveals a more gradual, but discernible trend in the same direction.

Although council housebuilding rose steadily to peak in the years 1954 to 1957 (see fig 6.3) municipal bus patronage remained static. Many areas, such as Drumchapel, Castlemilk and Easterhouse were served by non-municipal transport undertakings, and although this dampens any upward trend it does not obliterate its slowness. Television, and to a lesser degree industrial resiting, was lowering the demand for travel and it was only because of this period of housing expansion that the buses could maintain their position. The down turn in municipal building came in 1957, and this coupled with the growth of working class car ownership stemming from roughly the same time, showed up the bus's apparent

¹ TCM 14/3/1955

² TCM 20/1/1958

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¹ TCM 14/3/1955

² TCM 20/1/1958

dominance to be a mere fleeting advantage. In simple terms the tramcar was the first to lose ridership because its patrons were able to afford cars and television^s years ahead of the riders of the bus network. Once the tramway policy of abandonment had been put into effect the bus in turn experienced the decline which turned out to be symptomatic of the public transport industry in general rather than of any mode in particular.

The tramcar was scrapped in Glasgow for financial reasons, but the analysis of the problem was not thorough enough. Public transport demand in the city was in decline after 1950 (see fig 6.3) and it was the tramcar which succumbed first to the powerful pressure of broadening affluence. The financial success of the bus was based on higher fares and the slim pickings from a rapidly extending suburban housing frontier. Its marginal effectiveness in this increasing potential should have provided sufficient warning of trouble in the future.

The ultimate irony came in the 1960's when car use not only affected bus demand but led to traffic congestion in which neither private nor public transport could function efficiently. Even before September 1962 when the last tram ran in Glasgow, its true rival - the car - was embarking upon its suicidal urban campaign. There is a certain ring of despair in the Transport Manager's Report for 1960:

"It is unfortunate that the advantages which should result from the elimination of the trams are being largely

nullified because in so many cases the inner traffic lanes cannot be used and moving traffic is being confined to a single lane which is blocked from time to time by motor-buses which are prevented from pulling into the kerb at stopping places".

Pyrrhus was alive and well and driving his Ford Anglia down Sauchiehall Street!

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1900

Source: H. J. reports

Table 6.1

EDINBURGH AND GLASGOW TRAMWAY COMPANIES' DIVIDENDS
1870 - 1919

1870 - 1894 Annual Dividends on Ordinary Shares

Year	Edinburgh Street Tramways Co %	Edinburgh Northern Tramways Co %	Glasgow Tramway & Omnibus Co %
1870	-	-	-
1871	-	-	-
1872	7	-	5
1873	2½	-	-
1874	6	-	-
1875	6	-	1½
1876	6	-	3 7/12
1877	7½	-	5½
1878	8½	-	5 5/6
1879	6½	-	5 13/24
1880	5½	-	8 7/36
1881	6½	-	9 7/12
1882	5	-	10 2/3
1883	4	-	11½
1884	5½	-	10 5/18
1885	5	-	10
1886	6½	-	8 5/18
1887	5½	-	8 11/18
1888	6	-	10½
1889	6	-	8 1/3
1890	6½	-	8 1/3
1891	5	-	6 2/3
1892	5	-	5
1893	5	-	5
1894	5	2½	3½

Sources: W W Duncan's Tramway Manual and company reports

1894 - 1917 Edinburgh and District Tramways Co Dividends

Year	Preferred Shares % pa	Deferred Shares % pa
1894	5½	-
1895	6	5
1896	6½	12½
1897	7	15
1898	7	15
1899	6½	7½
1900	-	-
1901	-	-
1902	-) 5½	-
1903	-) 5½	-
1904	-) 5½	-
1905	-) 5½	-
1906	-) 5½	-
1907	5½	-
1908	8½	30
1909	8½	30
1910	8½	30
1911	10½	50
1912	9½	40
1913	7½	20
1914	9½	40
1915	6½	10
1916	-	-
1917	-	-

Source: Company reports

Chapter 7 Towns, Trams and Travellers

"Transport systems shaped the urban environment by the accessibility they afforded to urban sites; by the consequent influence on the distribution of activities that generate travel; by the influence on travel behaviour and life styles; by the impact on the local economy, on institutions and on the quality of the environment. At the same time the urban environment influenced or rather constrained the choice of transportation options."

J Moise and M Wegener in the
Report of the 17th Round Table
on Transport Economics.
European Conference of Ministers
of Transport. Paris 1972.p18

Since private transport was relatively insignificant in urban population terms until the 1920's, we can safely say that nineteenth century towns depended entirely on their public transit networks for expansion. In the provincial cities road transport was much more influential than rail,¹ for two reasons. First, travel distances from the suburbs were quite short, and the shorter the journey the more must public transport provide a door-to-door service if it is to compete successfully with walking, its no-cost competitor. Secondly, within a dynamic situation, the high capital requirements of railway construction, especially in

¹A Briggs Victorian Cities 1963 p 15; J R Kellest The Impact of Railways on Victorian Cities, 1969; p288 & ch.10

termini, prevented railway companies from pursuing a policy of gradual short line extensions into the ever-receding housing frontier. Road transport, on the other hand, offered a more comprehensive and accessible network which extended into newly developed areas as soon as required.

The first major suburban growth of the century occurred in the housebuilding boom of the mid-1830's, and in the wake of its transit demands the omnibus flourished. But it became apparent very quickly that the omnibus was unable to satisfy the needs it had partly spawned. As a city-centre, short journey vehicle its drawbacks were minimised: in 1833 Thomas Creevey found the London omnibus to be "really charming",¹ but by the 1840's the omnibus commuter had swelled demand to the extent that the buses became too small, too stuffy, too dirty, and for these new suburbanites the vehicles were viewed "in the light of necessary evils than as a positive good".² To the more affluent citizens of British towns the omnibus was certainly considered as vital in the pursuance of the 'good life': the physical squalor of towns, their smells, noises and congestion all enforced the ideal of *rus in urbe*. Just as important, however, the squalor³ affected the working classes directly, and their

¹ Letter dated 5/9/1833 quoted in Sir H Maxwell The Creevey Papers 1903 vol II p262

² Chamber's Edinburgh Journal 16/11/1844 vol 2 p414

³ See the Second Report on the State of Large Towns and Populous Districts; PP 1845 vol 18

disgruntled agitations, expressed through Chartism and amplified by the unrest on the Continent, convinced many of the urban well-off to remove themselves from the urban scene.

By 1851 those in power were proud of the way they had avoided a crisis in the previous decade. The upturn in economic activity had relieved the tensions,¹ but, of equal importance, the exodus of many of the rich during the 1840's made comparisons of living standards that much more difficult. It was in this troubled decade that public transport, in the guise of the omnibus, first influenced the pattern of urban development, both physical and social. The omnibus initiated a process which only spent itself in the 1950's whereby "the upper middle classes were the first and the working classes the last to move into the suburbs, but they kept on doing so while the available means of transport were changing".²

If the economic revival of the 1850's had averted social conflict, like some perverted Pheonix, it bore within itself the seeds of future friction. As described in chpt 1, the commercial and distributional advances of the middle decades, with the related urban railway construction

²D A Reeder A Theatre of Suburbs in H J Dyos (ed)

The Study of Urban History 1966 p261

¹ See W L Burn The Age of Equipoise

(more strictly, urban termini construction), put central living accommodation under great pressure. The displacement of the working class central dwellers into neighbouring areas¹ narrowed the distance between the extremes in living standards, and also brought discomfort to bear on the emerging 'salariat' group in society. These people - the clerks, lawyers, secretaries, accountants, managers and small businessmen - were all products of the changing structure of industrial management and control, and their housing areas were being infiltrated by the displaced poor whilst their rising incomes brought suburban living and its higher status within their financial capacity.

In the 1840's urban unrest stemmed from bad living conditions; by the 1860's trouble was brewing again, but this time it was not only the quality of housing but also its diminishing quantity which was the cause. Best gives 'the age of equipoise' a span from 1850 to 1865,² and we have seen that in Edinburgh at least, by 1861 the better-off

¹ An excellent example is Manchester; see H Baker "On the growth of Manchester population, Extension of the Commercial Centre of the City, and Provision for Habitation - Census Period 1871-1881." Transactions of the Manchester Statistical Society 1881/5 vol 9; " . . . outpush of resident city population in the past ten years, viz. 34% of the whole residents at 1871, is representative of a business expansion of the city centre . . . " p8

² G Best Mid-Victorian Britain 1971 p228

section of the community could no longer ignore the situation. Elsewhere, the Liverpool Sanitary Amendment Act was passed in 1864 and the Glasgow Improvement Act followed in 1866. On a national level, the Torrens and Cross Acts became law in 1865 and 1875. These years were the decades of decision for the urban middle classes: they could stay in the towns and improve conditions, or they could leave the towns and forget the problems of bad housing, poor sanitation and ill health.

The many city improvement acts which were drawn up in haste in the 1860's were rarely implemented with the same vigour or enthusiasm. The reason for this change in tempo stems from the dramatic alteration in technical and political restraints experienced by the middle classes. The urban well-off of pre-1867 days feared the proximity of the masses yet had little political say in the matter. The omnibus could not cope with the total exodus of their number, yet their social and political masters had disallowed the vehicle's technical superior. George Francis Train may have been a hack engineer but he knew how to sell his tramcar. Not only would his Birkenhead line carry "the ladies of Lancashire and Cheshire . . . to St. George's Hall or the Philharmonic" but "in case of necessity, troops can be transported from one part of the city (referring to London) to the other, at ten miles an Hour".¹ Parliament, nevertheless, banned the tramcar on

the grounds of traffic obstruction, and some went as far as to say that Train was defeated by "class interests only".¹ The 1860 Parliament was composed of carriage-owning MP's who could experience the discomfort of a carriage sticking in a tramline as they travelled home to some dwelling protected from the ravages of urban discontent by high walls, street gates or sheer distance.

Following the Second Reform Act the balance of power shifted, and in 1870 the principle of tramways was conceded. Housebuilding and central reconstruction had increased the need for better transit facilities in the 1860's, so much so that by 1867 Chadwick was recommending Parliamentary approval for the tramcar,² and Charles Mackay saw the London omnibus collapsing under demands it was technically unable to satisfy.³ Only a few towns had building booms in this decade, but the two major ones were Birkenhead with a peak in 1862 and Liverpool with a peak in 1864;⁴ it is significant that these two towns should be the centres of the early tramway developments. Train's Birkenhead line was opened in 1860, and from 1865 the citizens of Liverpool supported the attempts of promoters to get tramlines laid in the city.

¹ C Greene and G P Rippon Street Railways in London 1860

² Royal Commission on Railways PP 1867 vol 38 pt1 Q 17181

³ Charles Mackay Street Tramways for London 1860

⁴ J Parry Lewis Building Cycles and Britain's Growth 1965 p66

The take-off in tramway building in 1872 ushered in the age of 'villadom'. It sparked off the urban exodus of those whose income and employment were unaffected by trade cycles¹ and whose desire for a new house was a function of economic and social pressures.² In 1887 Goschen described "the houses of the lower middle-class in particular" as "increasing with remarkable steadiness".³ These people earning between £150 and £400 per annum and living in accommodation of £20 plus per annum rentals, they were yet another strata of society to follow their social superiors into suburbs. If social forces were attracting these people to the suburbs, central living conditions were positively repelling them. Suburban middle class migration led to the central areas being turned into purely non-residential business sites where the working classes

¹ H J Habakkuk Fluctuations in House-Building in Britain and the US in the Nineteenth Century Journal of Economic History 1962 vol 22 p208/9

² See Kellett op cit Chpt 1

³ G J Goschen The increase of Moderate Incomes Journal of the Statistical Society vol 32 Dec 1887 p599

tried with increasing difficulty and cost to remain¹ as close to their workplaces as possible. City centres began to die: at night the business area² of Leith by 1892 was "as dull as the grave", and John Davidson in 1891 described the west-end of a city after midnight as "a graveyard paved with tombstones and crowded with mausoleums".³ The Leopold Blooms of Britain were dreaming of, and buying, their "bungalow-shaped 2 storey dwelling-house situated "within a time limit of not more than five minutes from tram or

¹ A S Wohl: The Housing of the Working Classes in London, in S D Chapman (ed) The History of Working Class Housing 1971 p16/17

² J Colston The Town and Port of Leith 1892 p84

³ J Davidson The Great Men 1891 p20

train line".¹ The result was the spread of "humble little villas on the outskirts of the city(s)".²

In contrast, the Royal Commission of 1884/85 found little evidence of changing life styles among the lower classes. Few, if any, working class suburbs arose as a result of better transit facilities. Job opportunity, cheaper slum rents, social and financial ties all kept the working man and his family in the centre. Giving evidence before the Commission, an ex-mayor of Liverpool saw no improvement in the most congested parts of that city since Dr Trench's report in 1865, and went on to say that such people had "the choice today between what are called suburban buildings and buildings in the town, and they take the buildings in the town in preference to buildings outside with all their convenience".³ His implication that central dwellers preferred living where they did is evading the issue. It assumes they had a realistic choice when in fact low wages alone prevented them from commuting. In

¹ J Joyce Ulysses 1922 Penguin ed; pp 633/4

² V S Pritchett A cab at the door 1968 Penguin p68

³ See D J Olsen House upon House. Estate Development in London and Sheffield in Dyos H J and Wolff M (ed) The Victorian City. Images and Realities 1973 vol 1 p338

³ Royal Commission on the Housing of the Working Classes
PT 1 PP 1884/85 vol 30 Q13537,13685

Edinburgh the average labourer's wage in 1885 was 15/- for a 51 hour week, and 1/- a week in tramfares "would make a very serious hole in his(their) wages".¹ James Gowan, an eminent Edinburgh contractor, inadvertantly described the tramcar as a middle class preserve; the city's cars carried very few workmen and he put this down to the cars being too expensive at 2d a day: "Personally, I get up early and travel a good deal by the morning cars, and I see that they are crowded by respectable men coming in to their work."² In many of the smaller cities it was the influence of inadequate purchasing power rather than the requirement of living beside some source of day-to-day employment which forced the working class to live centrally in bad but relatively cheap accommodation.³ Little was done to help them because their plight affected none but themselves. "The isolation of the poor - a theme which ran like a crimson thread through so many Victorian commentaries - was a corollary of the rise of the middle class suburbs in which geographical insularity was often a symbol of a more

¹op cit Pt 2 vol 31 Q18937/8

²op cit Q18935

³op cit Q19265 and see also Select Committee on Artizans' and Labourers' Dwellings Improvements PP 1881 vol 7 Q2459 and Q4732. For the situation in London see A Marshall, G Mulhall & E Hoole The Housing of the London Poor Contemporary Review vol 45 1884 pp 224-240, and A Mearns The Bitter Cry of Outcast London 1883 p 14/15

fundamental social and political separation."¹

For an increasing proportion of the population the necessary link between home and office was the tramcar; "it served a generation in what were surely the most fortunate decades the middle-class of this country has known."²

Lord Rosebery once described the tramcar as "the inconvenience of the opulent, and the luxury of the poor. You may always measure exactly the extent of the democracy of a country by the extent of its tramways".³ Presumably his democracy enveloped those in the middle ranks of society, neither opulent or poor. His classification of the market was faultless. In Glasgow Simpson has found that "if cheap mass transport was of dubious benefit to the upper class of the West End, for the working class populations of Partick, Maryhill and Anniesland it was largely irrelevant".⁴

¹ H J Dyos Victorian Suburb - Camberwell 1966 p25

² J & J Bell I Remember 1932 P21

³ Lord Rosebery The True Leverage of Empire Presidential Address at the Social Science Congress in Glasgow, Sept 10 1874. G F Train attributes this phrase to a Cunard captain in 1860

⁴ M Simpson Urban Transport and the Development of Glasgow's West End Journal of Transport History vol 1 no 3 Feb 1972

This spatial segregation of socio-economic groups was a continual process, but it was boosted by the cheap money of the 1890's.¹ Speculative builders threw up estates besides the tramlines and just beyond the termini. In Birmingham, for example, such building was "rampant" by 1895.² Just as the 1860/70 housing demands brought forth the tramcar, so now the 1890's found the horse tramcar to be too slow for the distances involved and too small for the passenger loadings sought after. This increased pressure for faster transit finally overcame the aesthetic drawbacks of overhead electric wires (which were found to be marginal anyway) and the electric tramcar began to appear on the streets of British cities in force from 1898 onwards.

The lower fares of the municipal and private electric tramways liberated another section of the community from urban living. This time it was the lower middle class and labour aristocracy who benefited. Over the period 1896 to 1913 the majority of houses built in Liverpool were in the rental range £18 to £25 per annum.³ In Dublin the new

¹ E M Sigsworth and J Blackman The Home Boom of the 1890's
Yorkshire Bulletin of Economic and Social Research 17 May
1965 pp 75-97

² S B Saul House Building in England 1890-1914 Economic
History Review 1962/3 p 130

³ *ibid* p 129

tramways were serving the "better-class worker", whether brain or manual": in Glasgow the trams were used by "those persons who do not require to be at work until after 8 am". The housebuilding in Salford was of "moderate-sized houses and ordinary dwellings" and in the Potteries new house rentals were in the range £20 to £25¹ per annum. The Dundee Blackness estate of the 1900's was typical of developments throughout the country. "The Blackness estate: . . has been handed over to the speculative builder, who is rapidly covering its sloping grounds with streets of villas and superior tenement dwellings. The situation is choice, and the surroundings beautiful. It is surprising, almost, to find such salubrity of dwelling within a few minutes run from the heart of the city."²

The labourer still lived in the centre by the factories and the workshops. In Glasgow special care was taken when considering extensions because "it is said that population follows the cars, but this only applies to villa and

¹ Evidence from the Royal Commission on London Traffic PP 1906 vol 42 Appendix J Tables 9 and 11; see A C Baker The effect of the development of housing estates on municipal passenger transport Electric Railway, Bus and Tramway Journal (ERBTJ) 8/7/1932 vol 67 pp 27-38

² A Reid Dundee from the tramcars 1908 chpt 5

other residents whom it is profitable to retain in the city. The wage-earner follows the shop, factory or shipyard".¹ A Government Inquiry of 1908² found this to be a general phenomenon in all the large towns, and its comments on Manchester show clearly the class of people who were able to take advantage of the electric tramcar. "On the whole the Manchester working people appear to live as near to their places of employment as possible, though, owing to the tramway system, there is a growing tendency to live out in the suburbs, where houses cheaper and better in accommodation can be obtained. This applies to the artisan class, but still more to clerks, bookkeepers, warehousemen, and other employers of small means"³ In Edinburgh the most a labourer could afford on tramway trips was 2d a day, representing "a distance which could be easily traversed by walking in fifteen minutes".⁴ This suggests that, as in Leeds⁵ and Salford,⁶ the labourer filtered up into dwellings vacated by the new suburbanites,

¹ Our Tramways Official commemoration of 15 years of municipal control; Aug 1909 p12

² Report on Cost of Living of the Working Classes PP 1908 Cmnd 3864. See also Select Committee on Housing of the Working Classes PP 1902 vol 5 Q1168

³ ibid PP 1908 p301

⁴ ibid p509

⁵ Royal Commission on London Traffic PP 1906 vol 42 Appendix J Table 11

⁶ R Roberts The Classic Slum 1971 p 115/6

but could only afford to do this within the penny stage; limit of the tramway network; he was not dependent on the system and Lord Rosebery's dictum of 1874 still held fast in 1914, the tramcar was still the 'luxury of the poor'. The pricing policy adopted by British tramway operators tended to perpetuate this passenger class distinction. In America the flat fare (5c) strategy¹ provided a definite incentive to live in the suburbs, but this, in many if not most instances stemmed from the dual rôles of tramway operation and real estate development² pursued by many American companies. In Britain each passenger paid the cost of his trip, and this in turn introduced marginal cost concepts into the decision making process regarding one's ability to live in the suburbs and how far into the suburbs one could go. Furthermore, municipal operators vied with each other in charging the lowest fare, and although the prime example of this was Glasgow with its addiction for half-penny tickets, it is noteworthy that this city had the worst slum problems as well. The two facts are not unrelated. By charging half-penny fares the Corporation had to make up revenue on the longer distance charges, and in this way, though political kudos from the low fare policy was immense, it forced the less well-off to travel within the low fare zone around

¹ See S B Warner Streetcar Suburbs - Boston 1870-1900 1962

² G M Smerk Urban Mass Transport at the Ebb in Smerk (ed)
Readings in Urban Transportation 1968 p6

and within the city centre. For those who needed new homes the most, tramway pricing strategy encouraged them to stay put. "The working classes have been misled into the idea that the half-penny tram fare is an advantage to them, but as a cruel and cold fact the conditions which it helps to foster are the very worst in all respects for themselves and their children."¹

Perhaps the most telling proof of the tramcar's failure to solve the urban housing problem - or indeed proof that the tramcar's role was not intended to be that of the mass mover - was the terrible housing situation prevailing after 1918. The cessation of housebuilding during the war had swelled the numbers seeking new houses by introducing to the constant element of those unable to live in better accommodation because of financial inadequacies, a new element of those unable to live elsewhere because of a housing shortage. Within this framework it was obvious that the latter group would take up any new housing brought on to the market. The recommendation of the Tudor Walters Committee of 1918 did much towards this end. By suggesting low density housing estates they were in fact impressing their ideals on others and in turn restricting

¹ W L Madgen "Notes on Tramway Fares and Services" Electric Railway and Tramway Journal 8/8/1919 vol 40 p51;

J Dalrymple, General Manager of Glasgow's tramway had to agree that this was so: ibid p53

the type of tenant able to live in them. Low density housing required cheap land¹ and implied relatively expensive building costs in contrast to tenement or block construction. The resultant council estates came to offer accommodation at rents higher than those prevailing in the centres and demanding extra costs in the form of daily transit charges to gain access to them.²

The council housing estates of the 1920's catered for the demands of the better-off working class,³ and the average labourer was still forced to live in the central business areas. "Unless he gets a council-house, a working-class man is likely to live in his local area . . . all his life. He has little call to move if he is a general labourer, and perhaps hardly more if he is skilled, since his skill is likely to be in a trade for which several nearby works, or some only a tram ride away, provide vacancies."⁴ In Glasgow one commentator described the new corporation estate at Knightswood, with rents of £38 per annum as meeting the needs of the "middle class" since its tenants comprised shopkeepers, clerks and teachers.⁵ Certainly

¹ Report of the Committee on Working Class Dwellings etc PP 1918 vol 8 Par. 10

² See G D H and M I Cole The Condition of Britain 1937 p161

³ M Bowley Housing and the State 1919-1944; 1945 p129. E D Simon How to Abolish the Slums 1929 p70/71. B Lenman and W D Carroll Council Housing in Dundee Town Planning Review vol 43 July 1972 p283

⁴ R Hoggart The Uses of Literacy 1957 p62

⁵ W Bolitho Cancer of Empire 1924 p43

the combination of high rents, transport costs, lack of facilities and dearth of female job opportunities militated against working class migration, but these constraints were not new, in fact they were the very causes giving rise to the urban housing problem in the first place. Not until 1935 was this grudgingly acceded to when the Housing Act of that year sought to encourage central residential development. After a century of exodus only the immovables remained, though in addition, many estate dwellers were drifting back after finding life on the outskirts to be too expensive.

Public transport was partly to blame for the demise of the rus-in-urbe-omnibus ideal. Housing development came first with transit as an afterthought. The Tudor Walters proposals involved the municipal transport departments in line speculation, and rather than commit themselves, the almost universal solution was to run the less-capital intensive bus in and out of the new estates. This was true of Glasgow, the city of trams, where lack of departmental co-ordination² and foresight

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- ¹
- ² Committee on Working Class Dwellings op cit 1918 par 17
T Brennan Reshaping a City 1959 p41. This lack of co-ordination was by no means confined to Glasgow. For a scathing attack on interwar development see F J Osborn Transport, Town Development and Territorial Planning of Industry New Fabian Research Bureau No 20 1934. See also R S Pilcher Road Passenger Transport 1937 p53

reduced the tramway manager to admit that "notwithstanding the superiority of the tramcar, the Corporation have been forced to start motor bus services throughout the city, mainly to supply the needs or the demands of the new housing schemes. These services are being operated right through the centre from one housing scheme to another using for the most part tramway routes".¹ Admittedly, many such bus routes were initially introduced as short-term facilities until the area produced a demand sufficient to sustain tramway operation, but in too many instances, the climate of political opinion regarding public transport was so changed in the later 1930's as to make the basic vehicle substitution strategy unacceptable.

The tramline's capacity to raise land values within its sphere of operation effectively kept the council house schemes out of easily accessible sites. Their requirements for cheap land placed them beyond existing tramway networks, and in the 1930's stable or falling passenger demands made speculative and large investments in appreciable track extensions very difficult to defend. This combination of low density public and private house-building dramatically altered the demand structure for public transport. Passenger potential per route mile in such areas was much lower than those experienced previously, but of greater significance, either bus or tram

¹ J Dalrymple From Sedan Chair to Motor Bus Transactions of the Old Glasgow Club vol 6 No 1 1928/29 p20

services could have coped satisfactorily with the peak-hour demands if only non-peak services could have been cut drastically if not altogether.¹ This is what the private bus operators did, but the municipal transport departments were expected to maintain high frequencies throughout the day. Society dictated that new estate dwellers should not be left stranded in the outskirts during the day, but no one was willing to pay for this service. The industry appreciated its dilemma, and realised that it was "performing a social service of national importance"² with little recognition from either national or local government. Parliament had been told many times by its commissions that the "solution of the housing problem largely depends upon the provision of adequate traffic facilities"³ but when the housing problem was being tackled the commitment towards public transport had diminished.

Within itself, the lack of commitment, as manifested in

¹ The issue was raised by J R Salter in Electrician vol LXV 10/6/1910 pp 361-363. For a recent discussion see G Ponsonby; The Problem of the Peak, with Special reference to Road Passenger Transport Economic Journal vol LXVIII 1958 pp 74-88

² W Vane Morland Slum Clearance Transport Problems ERBTJ vol 70 24/6/1934 p320

³ Select Committee on Transport (Metropolitan Area) PP 1919 vol 7 Report par 12

the introduction of the diesel bus reduced the off-peak frequency which could be economically justified. As Ponsonby has shown,¹ it is to the advantage of the commuter, the off-peak traveller and the operator to run off-peak services to the point where revenue earned in the trough covers the variable costs incurred; here wages can be considered as fixed, thus, from the data available, the relevant costs are maintenance and fuel. In the 1930's these variable costs in bus operation were over 5d/bm while the tramcar's costs were nearer 4.5d/cm.² The capital intensive nature of the tramcar, aimed at utilising cheap power and minimising tractive effort, resulted in its having the financial ability to serve the suburbs with a higher frequency of off-peak service; it had more potential to meet social demands within a framework of financial viability.

In answer to the higher fares and poorer service capability of the bus, the tenants of council house estates walked and cycled. Surveys carried out in Bristol and Liverpool attest to this trend.³ On the Norris Green estate in Liverpool in 1937 the daily number travelling by tramcar was 2,800; by bus 1,400; and by cycling 3,300. Those

¹ Ponsonby op cit

² Traffic Commissioners' Annual Reports; Ministry of Transport Tramway Returns

³ R Jevons and J Madge Housing Estates - Bristol 1946 p37...

cycling and walking comprised half of the total number of daily travellers on the estate.

By the 1930's, those who controlled the service were losing interest. Local councillors in the main were no longer dependent on public transport facilities. As discussed in chpt 4 the motor car not only found the tramcar to be intolerably obstructive to its own progress, but it had taken the mainstay of tramway demand, the middle class suburban dweller, into areas further afield. Filtering up and house subdivision brought many of the working class into a tramway-dependent environment for the first time as they moved into the old tramway suburbs of the 1880's and 1900's, but they had not the power politically to defend their new, but in itself decrepit, transport mode. The working class caught the tramcar on the rebound. Hoggart has described the tramcar of the interwar years as "the gondola of the working classes" and in that he is surely correct. For most urban citizens these vehicles expressed an alien way of life; they saw the tramcars running through their streets carrying commuters between town

University of Liverpool Social Science Dept - Statistics Division; Population Problems of New Estates ref to Norris Green 1939. K Leipmann in Journey to Work 1944 comments on the wide use of the bicycle p37.

¹University of Liverpool op cit p17

²G D H and M I Cole op cit

³In Birmingham in 1938 40-45% of the principal wage earners lived and worked in the same area; When we build again Bournville Village Trust 1941 p 66; in Bristol, 46% of wage earners in the central wards walked to work in 1946, Jevons

and the suburbs with little direct influence on themselves, and when at last some of their number managed to move outwards a little into the tramway catchment area, they boarded their gondola to find it was going to the breaker's yard.

By 1937 one person in every 25 had a car¹ which meant, since the average family comprised 3.6 people, that roughly one person in every seven had access to a car. This large car owning/new house buying section of the community moved swiftly into the newer suburbs in the 1930's as falling costs made both homes and small cars cheaper.² Plowden dates the rise of middle class motoring in the 1930's³ and this must be viewed in the light of Abram's

and Madge op cit p35. In Manchester in 1935, of 134 families surveyed in the central area of Hulme, 78 (58%) had no transport costs whatever: E D Simon and J Inman The Rebuilding of Manchester 1935 p108

¹ G Maxcy and A Silbertson The Motor Industry 1959 App D

² See M Bowley Fluctuations in Housebuilding and the Trade Cycle Review of Economic Studies vol 4 1936/37. Some Regional Aspects of the Building Boom 1924-36 Review of Economic Studies vol 5 1937/38. J L Marshall The Pattern of House Building in the Interwar Period in England and Wales Scottish Journal of Political Economy 1968

³ W Plowden The Motor Car and Politics 1971 pp263-285

comment that "the demand for owner-occupied houses in the 1930's remained, despite the downward percolation, predominantly a middle-class demand".¹ These new homes were built on the dearer land bordering tramway routes for those with no cars, and in more distant sites out-with the radius of existing transit facilities for those with cars. This growing band of car commuters sought optimum traffic flow on roads rather than optimum capacity use which meant that the tramcar not only lost an ally but gained an enemy. The bus may have satisfied the requirements of short-term cheapness, but it also fitted in well to the new traffic conditions generated by mass car usage. The bus replacement/tram scrapping episode of the interwar years was in fact the prologue to the far more complicated story of the late 1950's and 1960's. From then the overriding issue in the transit debate was that of the right balance between public and private transport. Since their respective patronage virtually divided the nation into opposing economic and political sets the more powerful private transport lobby came out on top. As car-ownership increased to the point of being self-defeating, probably just before the outbreak of the Second World War, plans for urban motorways were being suggested,²

¹ M Abrams The Condition of the British People 1914-1945 1945 p93

² See G Boumphrey British Roads 1939 pp 177-180

but it was not until the 1960's that such schemes were implemented in force. It is probable, however, that the urban motorway will, prove to be the redeemer of public transport. The vast amounts of traffic generated by such roads have made parking space relatively scarce and expensive while at the same time the urban motorway has neither the accessibility nor the direct area coverage offered by the street network. In this situation the motorist has the choice of a slow door-to-door journey or a faster door-to-somewhere-near-journey, assuming parking facilities are available. From the 1920's to the 1950's the minority motorist had a vehicle which was capable of speeds and access superior to public transport services; today both these advantages are in question. Hence the revival in the political status of urban transport operations - the formation of passenger transport executives in the major conurbations, the introduction of parking meters and other methods of restricting car useage: the middle class want something else now that their cars are of little benefit for central journeys. The working class inherited the tram-car when nobody else wanted it, and now they are buying cars which will soon be redundant in the urban environment.

Theories of Urban Sociology and the Tramcar

The rise of one-class suburbs from the 1840's onwards is well explained by recent sociological research. Timms'

analysis of modern cities applies with greater force to nineteenth century ones. "Physical isolation symbolises social isolation and decreases the chances of undesirable and potentially embarrassing contact." ¹ Hawley considers economic status an important determinant in the ranking of a suburb: "rent, operating through income, is a most important factor in the distribution and segregation of familial units. Those with comparable incomes seek similar locations and consequently cluster together in one or two selected areas within the community". ²

Social aspirations maintained the momentum of this trend: ³ "in order to 'rise in the world' those of inferior rank must endeavour to enter into relationships of rank-equality with those seen as possessing a more desirable position. An initial step may be to attempt to live amongst them". ⁴

If we accept that the industrialisation of cities, their huge uncontrolled expansion over the period 1780-1830, forced the rich to move out for personal reasons ⁵ - that is, they did not like living in these new towns, if indeed

¹ D G K Timms The Urban Mosaic 1971 p2

² A H Hawley Human Ecology 1950 p 282

³ P H Rossi "Why Families Move" 1955 p 179

⁴ Timms op cit p 101

⁵ See R Glass Urban Sociology in Great Britain: a trend report and annotated bibliography Current Sociology vol 14 1955

they had ever lived in them at all, then the omnibus and tramcar emerge as facets of underlying sociological desires which became possibilities for a growing section of the community as incomes rose. Figures 7.1 to 7.7 verify this hypothesis. Tramway statistics of all British Towns with a population of over 50,000 in 1891 are compared with respective town areas (we are neglecting the inaccuracy of municipal areas being used as proxies for actual built-up areas). The size of town had little effect on the length of tramway network: population and mileage were related, the larger population areas producing the longer systems, but the most significant correlation lies between population and passengers. It would appear that demand was primarily a function of population, and not of distance; demand was a social rather than a topographical phenomenon. The average town system in 1891 carried its population about sixty times in the year, or in commuter terms, around 10% of its populace.

¹ "commuter term" is an index for establishing, from trip data, an estimate of the number of people capable of being tramway dependent. Trip numbers are divided by 50 (number of working weeks in the year), then by 6 (number of days in the working week) and lastly by 2 (number of trips per day per person). In other words for the late nineteenth century the trip index is divided by 600.

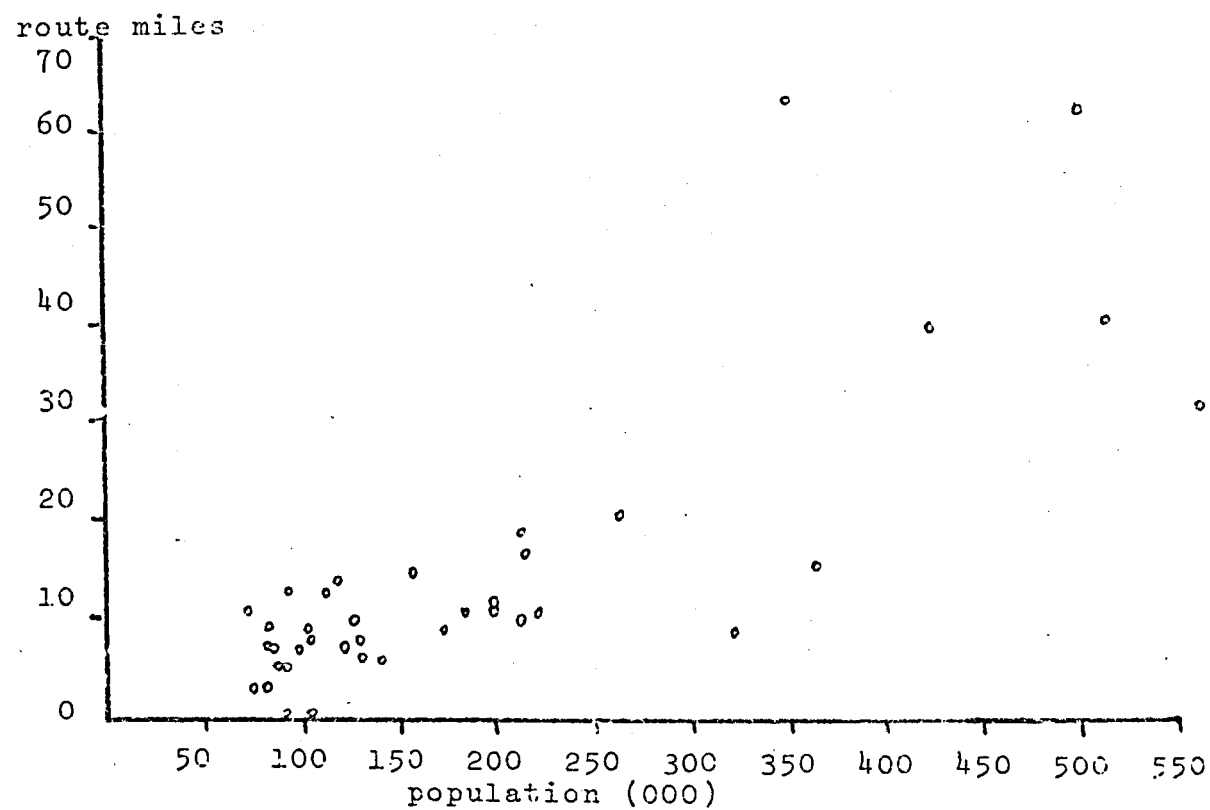


figure 7.1. 1891 Towns of population 50,000 + : Population v Tramway Mileage.

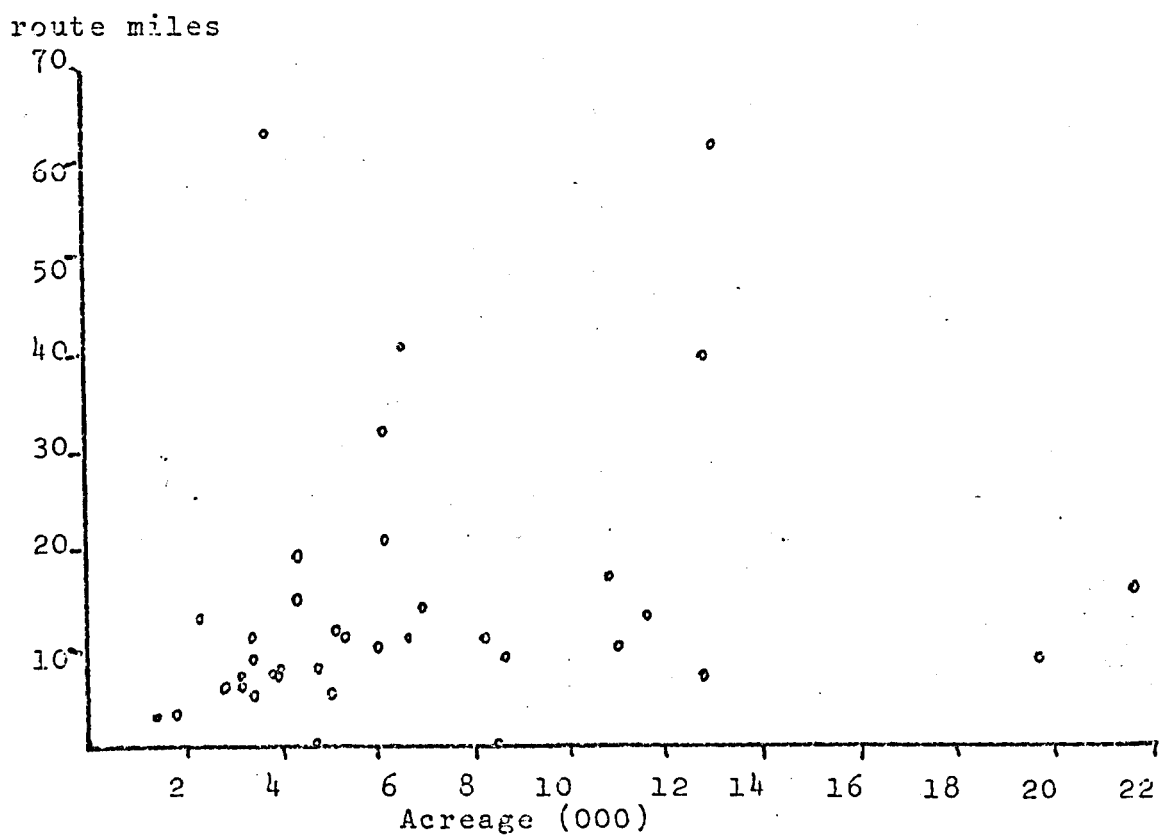


figure 7.2. 1891 Town Size v Tramway Mileage

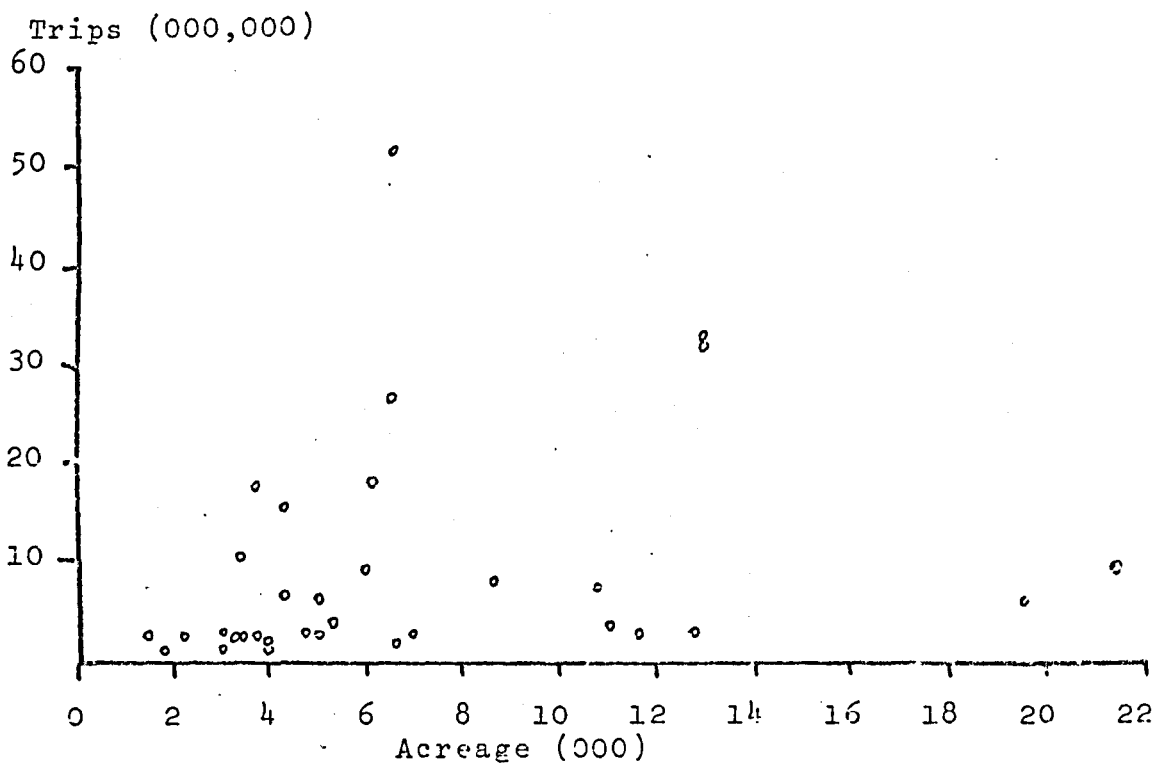


Figure 7.3. 1891 Town Size v Tramway Trips per annum.

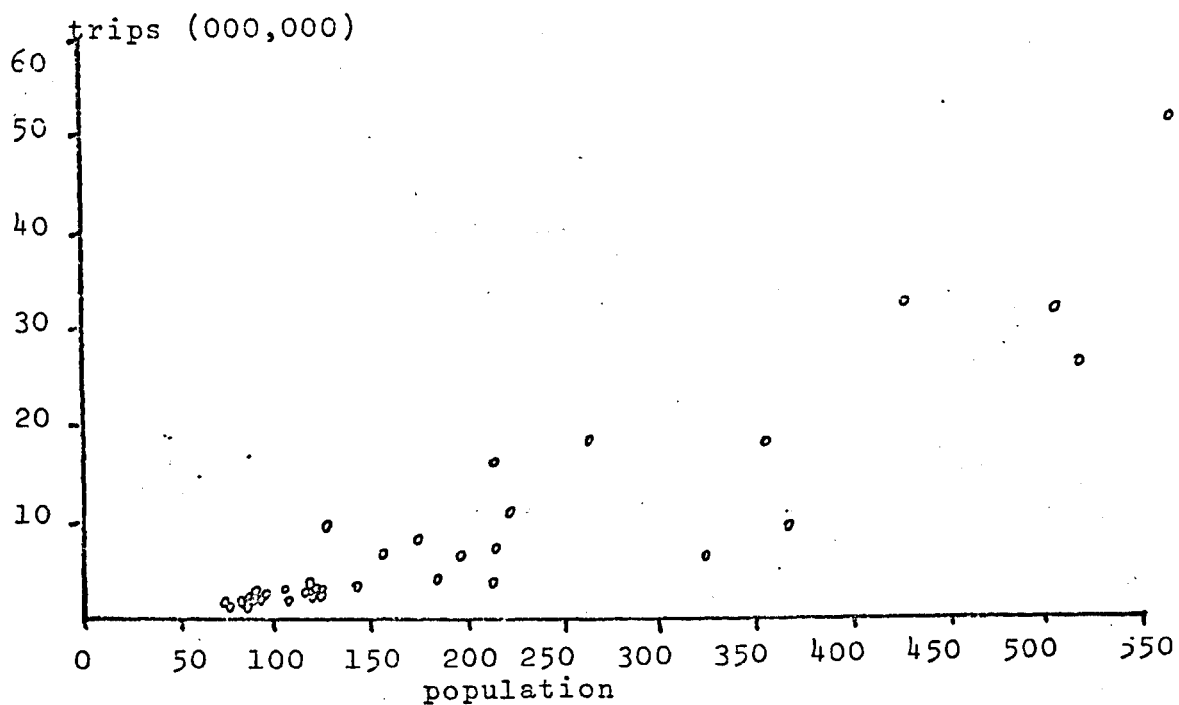


Figure 7.4. 1891. Town Population v Tramway Trips

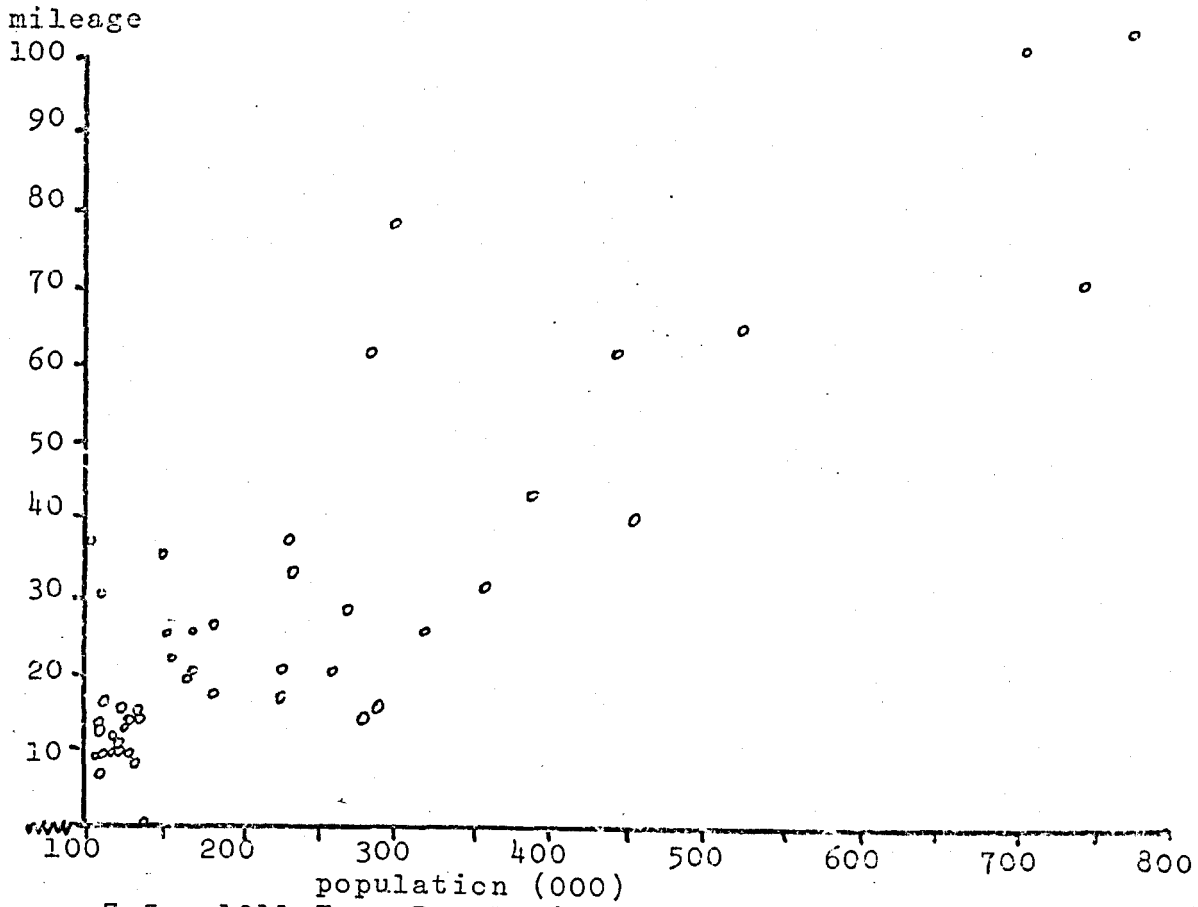
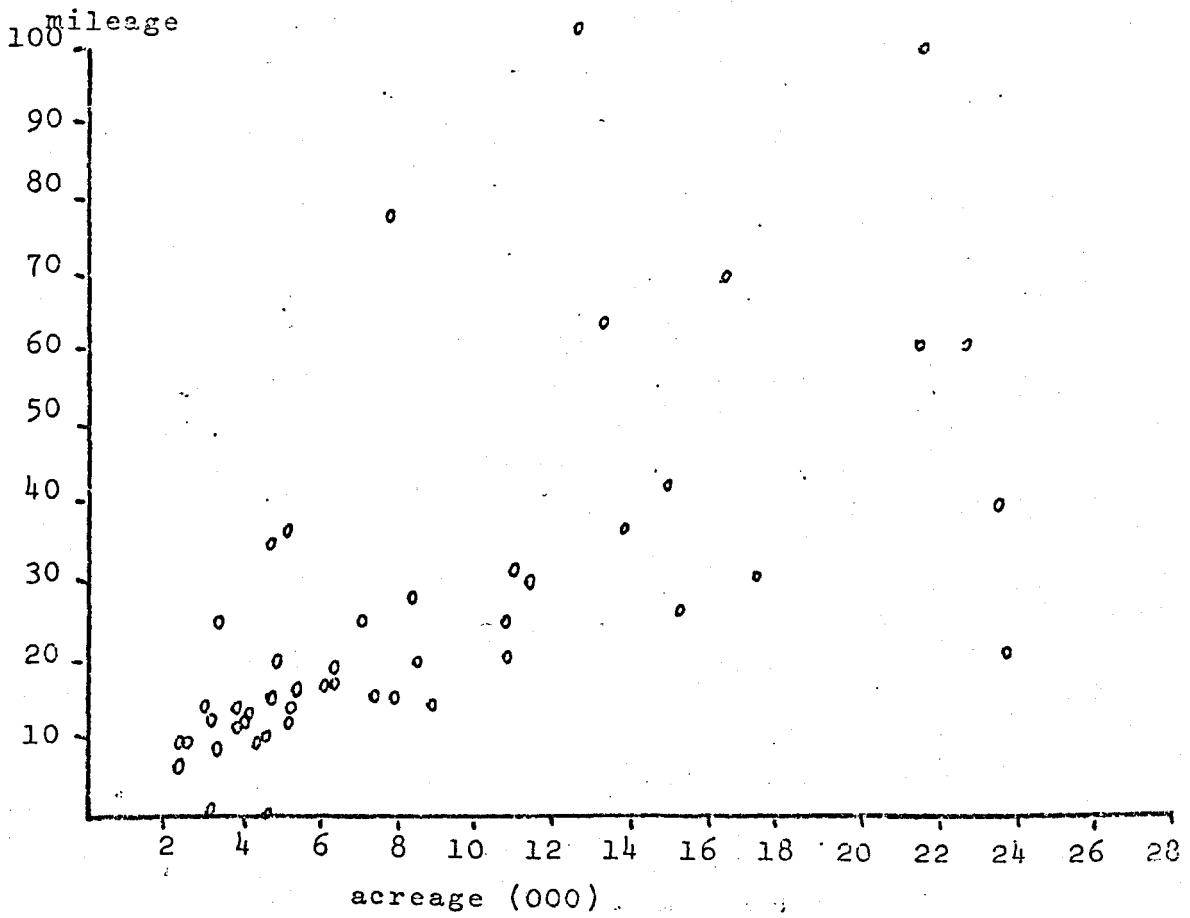


Figure 7.5. 1911 Town Population v Tramway Mileage



tramway trips (000,000)

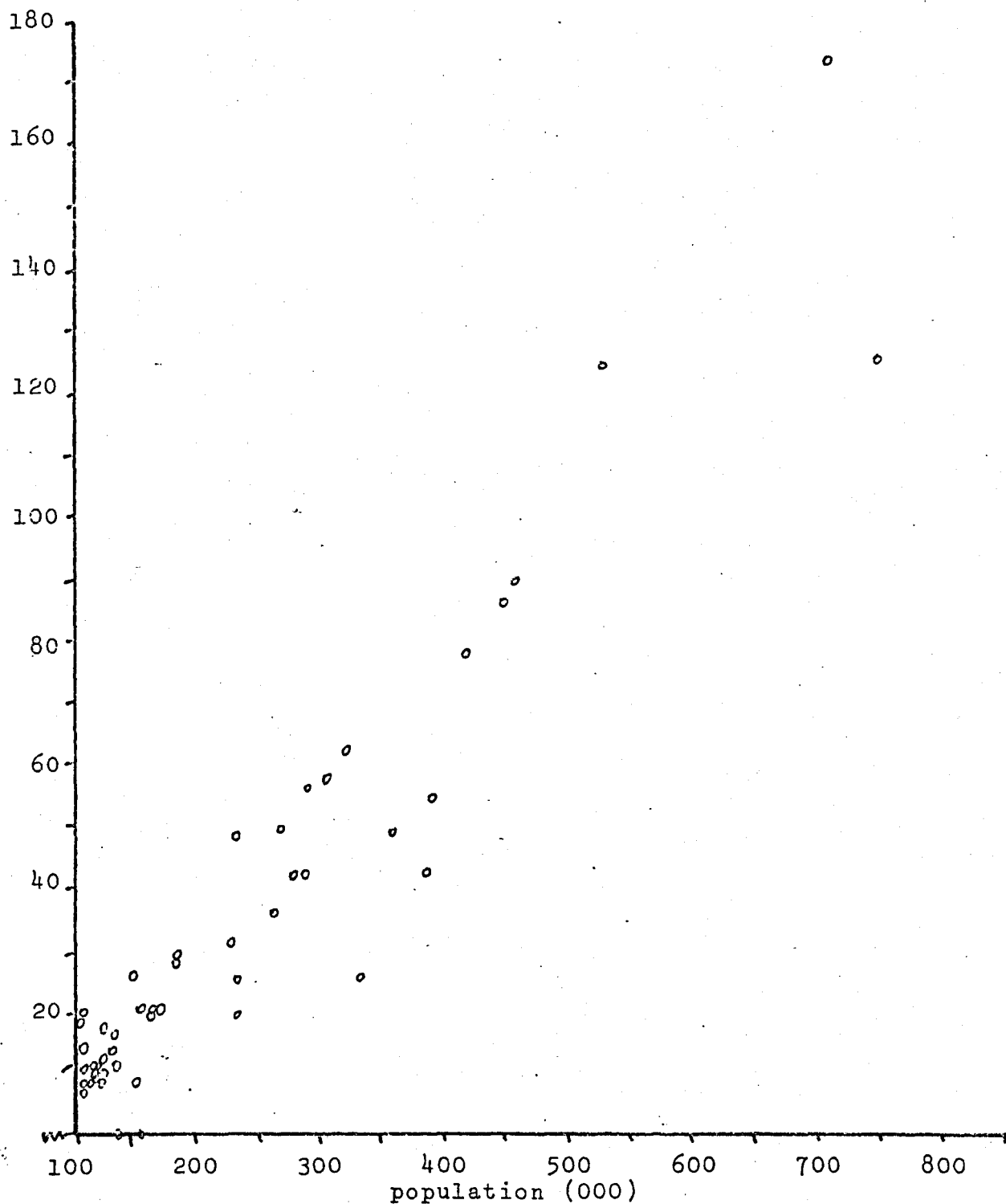


Figure 7.7. 1911 Town Population v Tramway Trips

Sources: 1891 and 1911 Census, and Board of Trade Tramway Returns

In 1911, after electrification and municipalisation, the dominant correlation is still between population and passengers. Now the average network carried 200 times its population or 53% in commuter terms - a good indication of the downward percolation of tramway useage throughout the period.

Although the evidence presented needs much more research, the fact that town size influences only mildly its related tramway length leads to the conclusion that the system was designed, not as an escape route to all sides of the town, but only to specific locations of good address, a la Hawley. No matter the physical size of the town it was the number of emergent desirable areas which dictated the length of its tramway system. This was the case especially in the private-enterprise demand-orientated 1891 situation when many of the larger towns had tramway systems no bigger than those of towns covering one-third of their area.

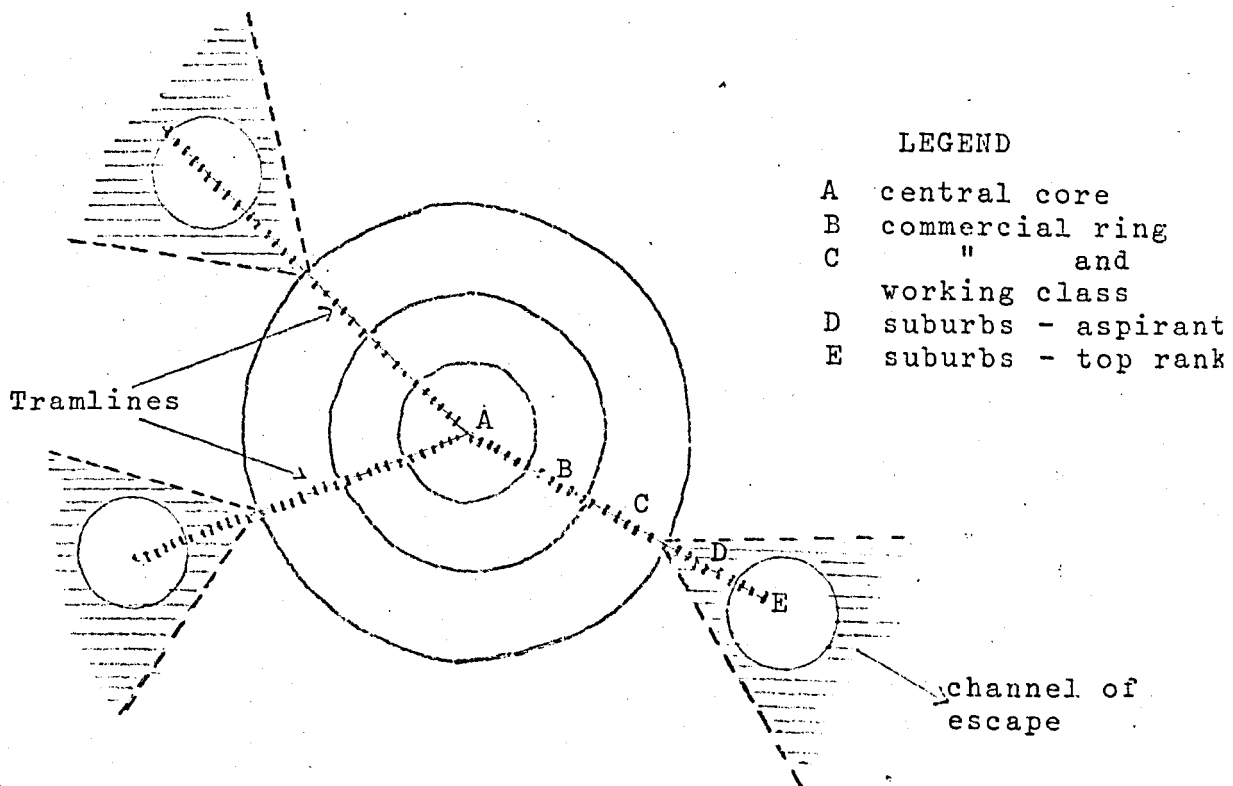
Once a residential area had gained the reputation of being 'Desirable' social aspirants sought to live there rather than in equally suburban locations. In Edinburgh the area of Inverleith died as a residential locus in 1868 when its connecting railway station was closed down in Scotland Street. Until the arrival of the cable tramcar in 1890 the area remained isolated in comparison with the tramway-suburbs of Newington and Morningside. Nevertheless, post 1890 development was not to be, partly because of feuing

commitments made in the interim, and partly because inaccessibility had prevented the area from remaining a 'good place' to live.

This interaction of tramway location and social aspirations produced a growth pattern in the form of a sector, starting in the inner suburbs and widening out towards the housing frontier. Hoyt describes this as the "sector theory of neighbourhood change" whereby "the different types of residential areas tend to grow outward along rather distinct radii, and new growth on the arc of a given sector tends to take on the character of the initial growth in that sector".¹ For 'radii' we can insert tramlines. Combining Hoyt and Burgess,² a model city morphology can be represented as below.

¹ H Hoyt The Structure and Growth of Residential Neighbourhoods in American Cities 1939 p 114

² E W Burgess The Growth of the City in R E Park et al. The City 1925

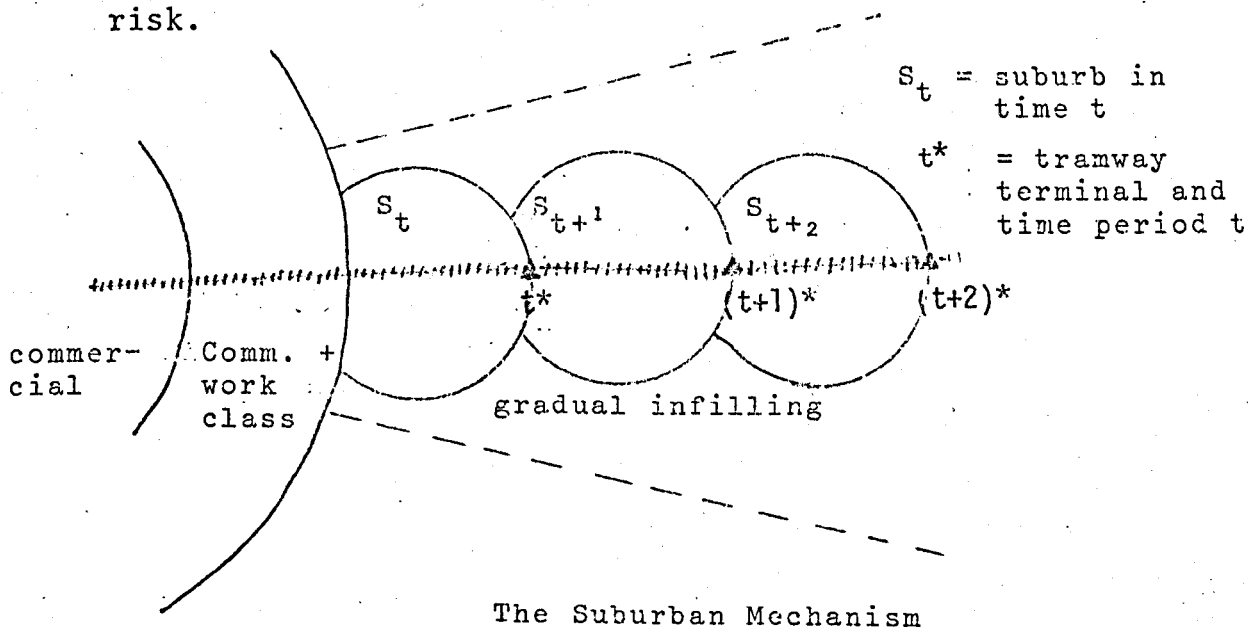


. A Model of Urban Growth

Land values in the suburbs were highest near the tram-
lines¹ because of their better accessibility, thus within
this socio-economic forcefield the upward aspiring
suburbanite located himself in the more distant periphe-
ries of the suburban sector, trading off lower rentals for
more time spent in the total commuting trip. In this
way the nucleus of comfortable families in each suburb
were shielded by a chevron of lower ranking disciples
which in its turn prevented the individual sector nuclei
from merging and directed the exodus of the leading ranks
ever outwards and away.

¹ Royal Commission on London Traffic PP 1906 vol 42 App J.
Table 9

The tramway suburban mechanism in dynamic form is shown below. It suggests that the tramway could influence suburban expansion without itself taking any financial risk.



The suburban growth in time period t (S_t) generates a transit demand such that the extension of the tramway terminus to the housing frontier produces quick financial returns. The terminus is built at the end of period t (t^*) but its very construction brings the outlying land within commuting distance (walk and tram) and consequently suburb S_{t+1} develops. At the end of period $(t+1)$ another tramway extension is built to $(t+1)^*$ and in turn suburb $(t+2)$ becomes a practical speculation. In this way, transport and housebuilding are closely linked, but it is the former activity which takes the risks although it should be emphasized that the rate of housebuilding is dictated to a large extent by the pace at which the transit operators decide to extend their systems. This interaction allows the tramway companies to contribute

to the growth of suburbs while following the financial policy of short-term pay back on line investment.

Sectorial expansion was very much a function of tramway operational policy. New 'good areas' were difficult to open up without transit links, and the tramway undertakings were more concerned in the development of existing lines. Thus growth was concentrated into a few locations in every town, locations previously identified by the horse omnibus. For 'a private tramway company the shorter the routes per 1000 of population the better the dividend',¹ and this was the unfortunate dictum followed by their municipal counterparts.

Until 1914 the economics of urban transportation, the calibration of land values, and the demands of socio-economic groups jelled into a successful urban dynamic. After 1918 the council house estate introduced the concept of outskirts rather than suburb (ie the zones between the suburban sectors) and the car freed the leading groups from moving out in the simple radial extension principle. The closely integrated mechanism of the growing suburb had collapsed and urban transport was the first to suffer.

¹ A Stalker Summary of the Report by the Royal Commission on Housing in Scotland 1918 p 58

Case Study 1 - Edinburgh

Any discussion on nineteenth century expansion in Edinburgh has benefited substantially from the recent work of George Gordon.¹ His maps of the status areas of the city in 1855/56 and 1914 (see Figures 7.8 and 7.9) show very clearly the results of the middle class exodus. The working class/industrial areas remained in the central band of Leith, Holyrood and Fountainbridge with more recent additions in Gorgie and Dalry whereas homes of rateable value £21 per annum and over spread themselves over, in the main, the southern districts of Newington, Grange, Morningside and Merchiston with another major focus in Murrayfield. By 1914 the southern suburbs accounted for 55% of Grade II dwellings (£70-£114 per annum rateable value),² 56.6% of Grade III dwellings (£40-£69 pa rv)³ and Marchmont had the largest agglomeration of Grade IV houses (£21-£39 pa rv) inhabited mostly by 'white collar' workers. These findings should be borne in mind when references are made later to the map of the city's growth.

It was no coincidence that the first tramlines in the city should run to Morningside, Newington, Grange and Murrayfield. The omnibus and private carriage had made these suburbs 'desirable' and the tramcar was to make them attainable. The tramway link from Leith to the southern districts of

¹ George Gordon The Status Areas of Edinburgh. A Historical Analysis PhD thesis Edinburgh University 1971

² op cit p124 ³ op cit p130 ⁴ op cit p143

STATUS AREAS OF EDINBURGH & LEITH IN 1855-56

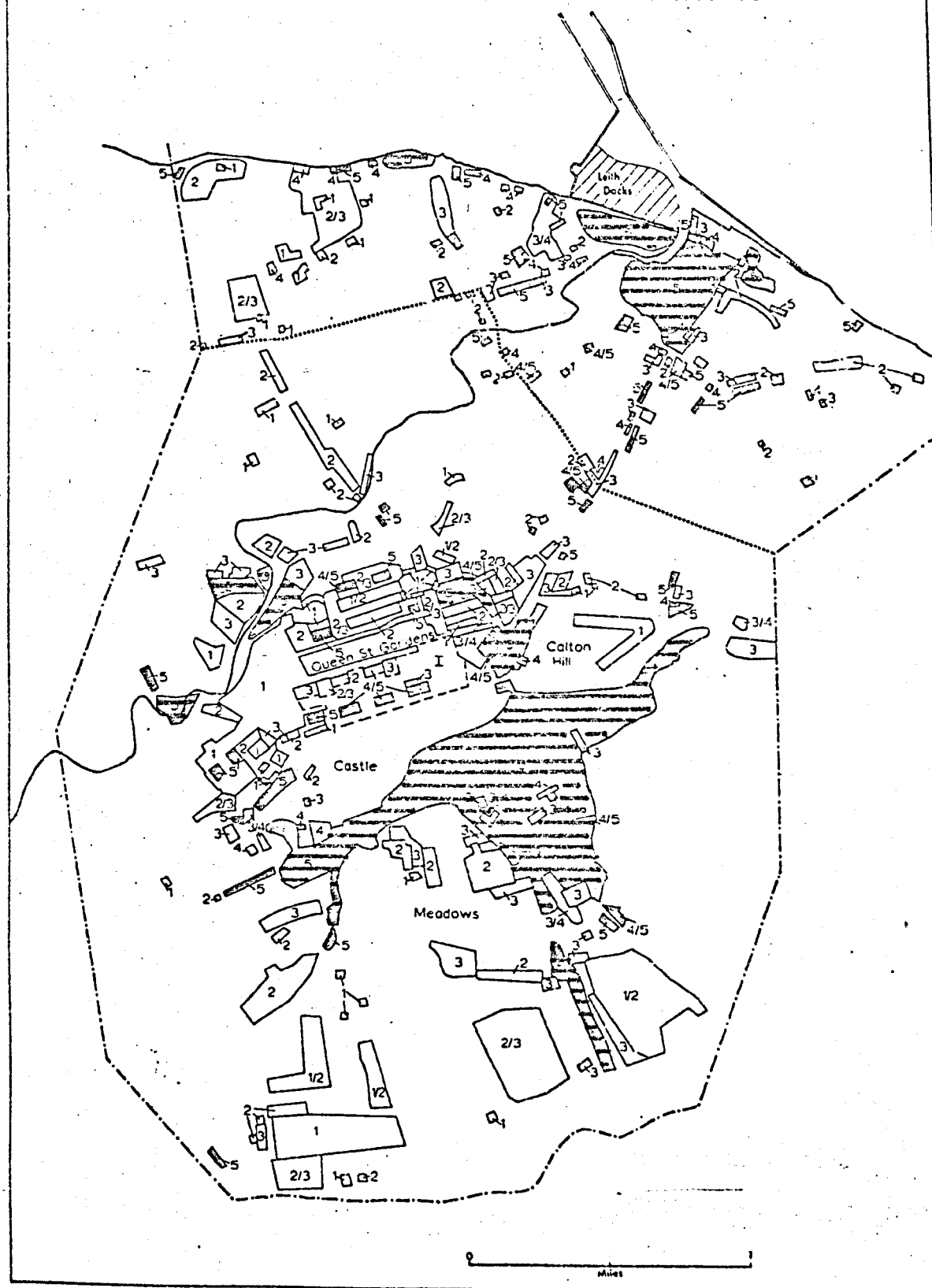


Fig 7.8 The area of housing of rateable value less than £20 pa (shaded) 1855/6

Source G Gordon op cit Fig 12 Reproduced by kind permission of the author

STATUS AREAS OF EDINBURGH IN 1914

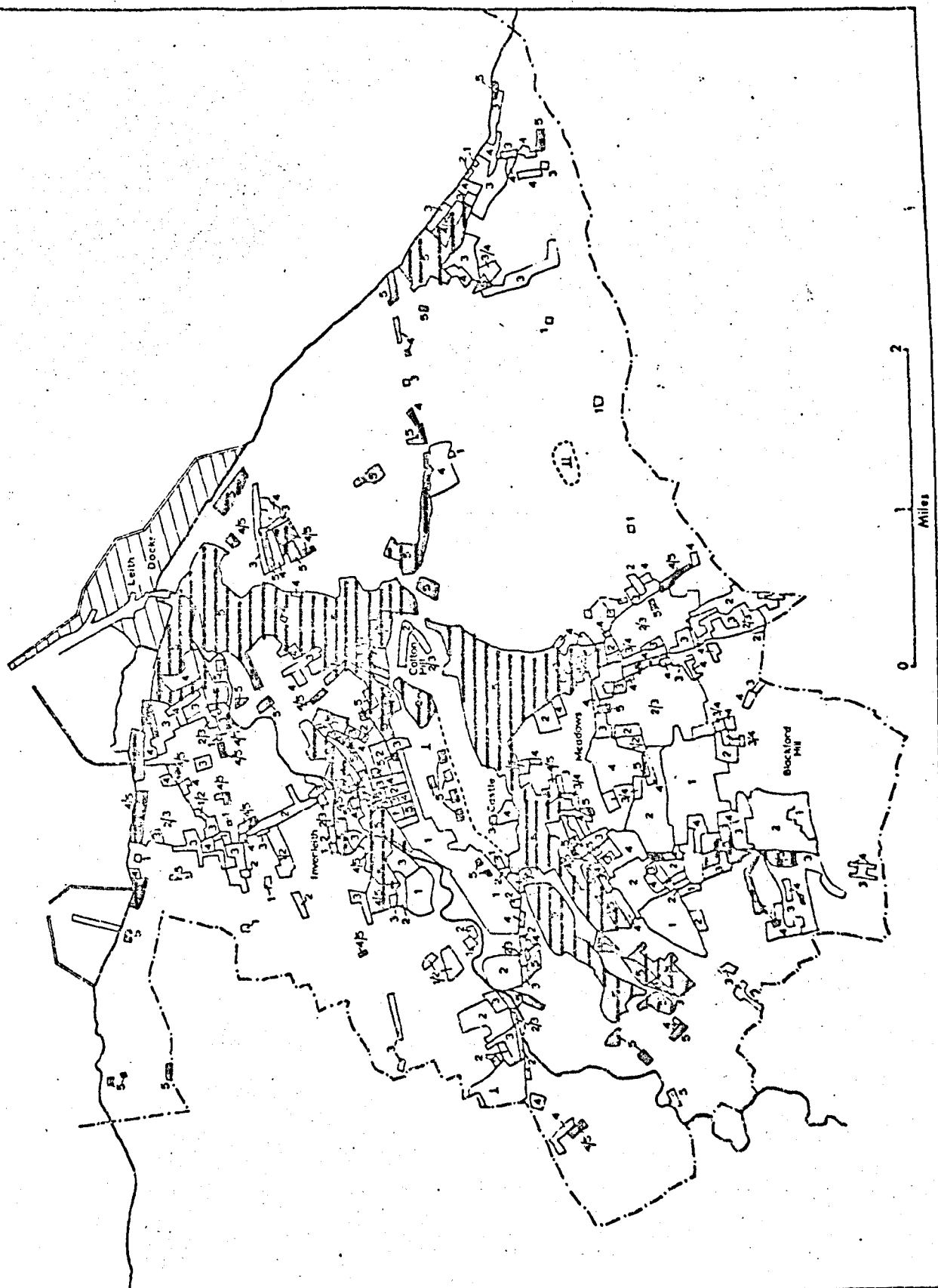


Fig 7.9 The area of housing of rateable value less than £20 pa (shaded) 1914

Source G Gordon op cit Fig 21 Reproduced by the kind permission of the author

Edinburgh withdrew the social elite of the port and deposited them in Newington and elsewhere: "the generality of the large traders in Leith have now no local habitation in the town, with the exception of their warehouses and offices or chambers. They have become citizens of Edinburgh".¹ As early as 1874 such commuting was common and the company received sharp criticism for revising the tramcar timetables in that year from those Leith businessmen who had "lately settled in Newington, believing a car or cars would be run from that district to take gentlemen down to business before the valuable morning was well advanced".² The Edinburgh Merchant Company opposed fare increase proposals in 1874 since they would reduce the number of pupils who were at the time travelling by tramcar to and from their schools.³ By the 1880's the first wave of suburban push had receded. Dr Wood, speaking in the 1860's found the new suburbs to be of sociological interest: "I wonder what one of our well-to-do shop-keepers in Princes Street or George Street would say now if asked to live in a flat three stairs up in such streets as Richmond Street, or that network of old narrow streets running between Nicolson Street and Clerk Street on the west, and the

¹ James Colston The Town and Port of Leith. Its Historical Connection with the City of Edinburgh 1892 p 84

² Letter in Scotsman 21/1/1874

³ A Heron The Merchant Company of Edinburgh. Its Rise and Progress 1903 p 314

Pleasance on the east; and yet many of their predecessors lived there and brought up their families peacefully and contentedly; and if they thought of villas at Newington, the Grange, Merchiston, or Trinity, with conservatories and vineries, it was but in their dreams, and as merely pleasant castles in the air".¹ Such people had now become commuters: their demand was such that in 1874 the tramway company proposed a system of fixed schedule cars with reservable seats payable by season ticket "to accommodate persons going to and returning from Edinburgh daily at fixed hours (as to offices and Schools) . . .".² The ladies of Morningside even donated a shelter at their terminus for their tram drivers.

On the other hand, no workmen's cars were run until mid-1876 and even then they were little used by those for whom they were intended.³ Over the period 1883 to 1889 when the company published its workmen's cars' loadings, the highest use was made in the second half of 1887 when 115,654 trips were so recorded, yet this accounts for only 1.9% of the total trips made in the half-year. When Gowans statement that many businessmen used these cars is considered, the value of such cars to the working class becomes quite insignificant. In commuter terms, the

¹ T Brown Alexander Wood 1886 p 178/179

² Scotsman 14/9/1874

³ Royal Commission on the Housing of the Working Classes (2)
Scotland 1884/5 vol 31 Q 18862/3

workmen's cars' loadings produce a demand of 400 people. The working classes themselves preferred, or were forced, to live near their work beside the breweries, railway yards, rubber works and mills of Abbeyhill, Holyrood, Dalry, Gorgie and Fountainbridge. Their travel habits influenced the tramway receipts quite markedly at the margin with their non-essential journeys based to some extent on the state of the weather.¹ In bad conditions the recreational trip was pointless and indeed it could be hazardous given the fact that the top-decks of the trams were uncovered. More than once the chairman of the company remarked that "tramway companies were like barometers. They could also tell from their receipts the state of the weather".² James Gowans, local councillor, one-time Lord Dean of Guild Court, and major tramway builder and executive, listed his solutions to the housing problem in 1885; his answers lay in better sanitation and ventilation.³ A man wholly conversant with both housing problems and tramway operation never toyed with the idea of using the latter to relieve the pressures on the former.

The pricing policy followed by the Edinburgh and District Tramways Company ensured only marginal fare reductions as a result of cable conversion. Fare per passenger dropped by

¹ Gordon op cit p 159/160

² Edinburgh Evening Courant 22/1/1876; 1/2/1878

³ J Gowans The Maintenance of the Health of the People and the Beauty of our City 1885

only 4 to 5% over the decade 1895 to 1905 whereas wages after 1900 remained fairly stable and prices rose.¹ The cable conversion did not allow appreciable widening of that section of the Edinburgh community able to afford tramway commuting. The period 1895 to 1914 saw annual UK passenger figures increase by 400%, whereas Edinburgh's rise was only 217%. From the outset it was assumed that the city's market for transit would remain restricted. When the Burgh Engineer reported to the Council on the possible routes for their newly acquired tramway network, he dismissed proposals to run a line along Broughton Street in favour of laying it along Duke Street: "On the one hand, Broughton Street and district is largely populated by the working class, and is very poorly provided for as regards travelling facilities, besides lying on a steep slope. On the other hand, the Duke Street route would prove serviceable to a district whose inhabitants would greatly appreciate a lift up the still steeper slope . . .".² It would appear that income and ability to negotiate steep hills was inversely related in the city at the turn of the century. (See Figure 7.9 with reference to the different rateable values of Duke and Broughton Streets). In the previous year the Scotsman report of a council meeting emphasised the strategic thinking of the time; the Lord

¹ W Ashworth An Economic History of England 1870-1939; 1960 p 200/01

² Edinburgh Street Tramways p3. Report by the Burgh Engineer to the Lord Provost's Committee on Cabling of Tramways Jan 1895

Provost said, "I trust, too, the council will at once take up the question of a liberal extension of the tramway system - (hear, hear) - in such districts as Newington, Warrender Park, Morningside, Broughton Street etc - A voice 'Gorgie' ".¹

In the same year that a Parliamentary Enquiry reported that few workmen used the Edinburgh tramcars (Report on the Cost of Living of the Working Classes, 1908), Keith was describing Newington "where villadom begins" and the Braids and Morningside as expanding areas because "the solicitors, accountants, stockbrokers, and insurance men who abide out here find the tramway and suburban railway service to and from the city sufficient for their wants".² A local inquiry of 1907 heard how Morningside had "only a few houses at one time, but the tramways have attracted a large population there, not a tenement population . . .".³ Earlier in the year a major argument against the proposed Pleasance tramline was that "the labouring classes who lived there could not pay for travelling and tramway facilities for themselves and their families".⁴ Such views

¹ Scotsman 20/11/1894

² A Keith Edinburgh of Today 1908 p 144/5

³ Edinburgh Corporation (tramways etc) Order. Proceedings of the Inquiry held on July 24th and 25th, 1907. Q146

⁴ Councillor Arbuthnot Murray : Scotsman 23/1/1907

were vindicated by the financial failure of the only truly working class line in the city; the section of the Dalry line running west of Ardmillan Terrace never paid for itself.¹ (The section eastward to Haymarket was part of the Haymarket-Merchiston circle).

After the 1914-18 War the corporation commenced its out-skirt municipal housing policy and moved much of the central population to the edges of the city. Their communication needs were met by putting on buses, and only those of the working class who infiltrated into homes deserted by families living in the new private housing estates of Craigleith, Blackhall, Costorphine, and Greenbank, became dependent on the tramcar for the journey to work. In the interwar period (1921 to 1939) the tramways increased their passenger carrying by 58%, from 88 millions in 1921 to 146 millions in 1939. The bus services increased their custom by 500%, from 10 million trips to 60 millions over the same years. This huge rise in bus patronage is explained quickly by referring to Map 1 where there is a noticeable absence of tramway communication to the municipal schemes of Sighthill, North Broomhouse, Pilton, Lochend and Craigmillar. In the 1930's the bus routes with the highest demands (measured by passengers/bus mile) were those serving Stenhouse (10.64), Easter Road and Slateford Road (9.26) and Pilton (9.14). The tramcar remained the preserve of the better-paid craftsman and the lower ranking professional, but this does not mean that the tramcar

¹ Report on Provisional Order Inquiry 1907 op cit reported in Scotaman 24/7/1907

was not used by others. Rugby and football matches generated huge trip demands to Murrayfield and Tynecastle, and the other recreational pursuits such as country walks, visits to cemeteries and the like also took the lower paid onto the tramcars. But these were still marginal activities: for the most part the working man before 1939 either lived close enough to his work to walk there, or had been dumped so far in the outskirts that tramway links were deemed uneconomic. His rising real wages, especially since the city's tramfares remained stable, had removed the financial restraints on his travel habits, but the housing and transport strategies of the interwar years introduced the new and more powerful restraint of inaccessibility.

Throughout its existence the Edinburgh tramcar was most appreciated by middle class suburban dwellers, and their housing demands were influenced by tramway policies.

Although neither company nor corporation planning allowed for major tramline speculation this does not imply that the tramway's role was entirely passive. After only six years' operation the company secretary maintained that his lines had not only brought about more house building but that "the houses that existed previously to the extension of the tramways have increased in value from one-third to

¹ See S Pollard The Development of the British Economy 1914-1950 1962 p 291

one-half".¹ It became clear early on that builders and land dealers would be well advised to concern themselves in tramway affairs. Late in 1883 the Edinburgh Merchant Company reported with satisfaction that their tramway dealings of 1880-84 (see chpt 5) had resulted in enhanced estate values in Merchiston;² and in the same year the city faced the promotional pressures of what was probably one of the most land-value-oriented tramway companies in the country. The Edinburgh Northern Tramways Company stated its main intention to be the raising of land values in Trinity and Goldenacre; indeed the whole exercise was geared towards this end rather than tramway operation per se. The promoters were all land owners, property dealers, engineers and contractors; David Dove and Patrick Turnbull were also directors of the Trinity Lands Company; Peter Couper was in partnership with John M Cook, manager of the Property Investment Company of Scotland; W H Beattie owned land at the northern end of Inverleith Row. Although their tramway did not prove to be the means of opening up the area to builders, it would appear that contractual ties were the barrier. The northern lands had lain isolated since 1868 and in the interim period until 1890 the land was put to less remunerative use such as market gardening and playing fields. The Superintendent

¹ Report on Tramways (Use of Mechanical Powers) PP 1877 vol 16 Q 1001. See also Dr Wood's evidence in Report on Tramways PP 1878 vol 18 Q 1067/8

² Courant 9/11/1883

of Works of George Heriot's Trust, a major land holder in the area, reported in 1894 that "since the introduction of the cable tramways there is a demand in this locality (Inverleith Row) for better class flatted houses, self-contained terrace houses, and small villa and cottage property".¹ Plans were drawn up for terraces and crescents in the New Town tradition, yet there was the problem of compensation to present leasees. In the event the plans were never implemented.

A company which did profit from the cable tramways was the Murrayfield Real Estate Company Ltd. Formed in 1900 it paid a dividend of 4% in 1902 and 6% in 1903, largely on the basis of electric light and cable trams coming into their area and increasing its attractiveness.²

The embodiment of this land/transport interaction was Thomas Lansdale. He was a director of the horse tramway company, though not, significantly, from the outset; he was a land valuator, a member of the Lord Provost's Committee in the council, and a director of the Edinburgh Suburban and South Side Railway. The influence on suburban land values which men such as he could wield was potentially enormous.

¹ Report by the Superintendent of Works of the George Heriot's Trust upon the Unfeud Lands Belonging to the Trust 1894 p 7

² Company Reports in the Scotsman 30/6/1903

A look at the actual building/tramway mechanism in the city leaves no doubt as to the importance of tramways in suburban development. It also shows how the companies' fear of risk and shyness of long-term line investment programmes was not at odds with the demands of the suburban house-builder and land dealer. Map 1 shows the growth of the city's built-up area in decennial stages, and the extension of the tramway system in five year periods.

The city of 1865 covered the New Town, Tollcross, Churchill, Salisbury and Holyrood. There were substantial settlements at Leith, Costorphine, Liberton, Granton and Trinity. The areas of major suburban development in the decade 1865-75 (period 1 on the map) were Merchiston and parts of Grange and Newington. Industry-based building took place in Haymarket, Cannonmills, Leith, Lochend and Abbeyhill. The decade 1875-85 (2) had its major expansion in Newington, Merchiston, Murrayfield and Dalry, the last named being another industrial working class area. The decade to 1895 (3) saw concentration in Morningside, Newington and Trinity, with lower class building in Gorgie and Easter Road around the breweries and railway yards. In Morningside, Newington, Murrayfield and Trinity suburban expansion remained constant over the turn of the century (4) and concomitant industrial housing was erected in Gorgie, Dalry, Lochend and Abbeyhill. Those years before the First World War (5) saw only small additions in Leith and Murrayfield, with this trend repeating itself in the decade 1915-25 (6) when local authority schemes were first to emerge in Lochend,

Northfield, Slateford and Pilton. It was the 1925-35 period (7) which showed the most building activity; council estates rose in Craigmillar, Slateford, Stenhouse, Pilton, Restalrig and Niddrie, while private developers opened up Greenbank, Colinton, Costorphine, Blackhall/Davidson's Mains, Craigleith and Craigentenny. This was the direction of development when war broke out in 1939(8).¹

The superimposition of tramway extensions onto the building picture shows a fairly clear suburban mechanism at work, bearing in mind the complex legal and personal restraints encountered in making land available for building.² Two suburbs give sufficient understanding of the mechanism at work.

The original Morningside tramline stopped at Churchill since it was designed as a southern district circular rather than as a suburban line in its own right, yet popular demand brought about its extension into Morningside proper in 1883. As a consequence, building activity increased and the line was further extended. At the turn of the century the Corporation were able to push the terminus out

¹ For a comprehensive analysis of the growth of the city and its industries see A J Strachan The rural-urban fringe of Edinburgh 1850-1967 Edinburgh University PhD Thesis 1969

² See for example H J Dyos Victorian Suburb - Camberwell Chpt IV

to the Braids based on the hinterland of demand cultivated in Morningside.

In Murrayfield the company's conservatism delayed building quite considerably. The original terminus at Roseburn was opened in 1871 with resultant development in Coltbridge. However, the major building took place further west, and comprised large walled, carriage-dependent houses built for the rich. The Coltbridge development was a case of areal stimulation by their social aspirants. Transport restraint, in the form of a static terminus, produced stagnation until the council embarked on its policy of line extensions to the city limits, and there immediately followed the infilling between the two original built-up areas. To the stockbroker and the accountant, Murrayfield had arrived.

Other suburbs show the mechanism working in more striking and less detailed ways. The villages of Colinton and Costorphine had no building boom until after the arrival of the tramcar. Perhaps the most telling proof of the tramcar's developmental properties lies in the building history of the north-west side of the city. Physical limitations of the Dean Bridge prevented any tramway

! The bridge would have had to be totally reconstructed, and was narrow enough as it was to block traffic movement. The less direct route to the Coltbridge cable terminus was the only alternative. See Lord Provost's Committee meeting re Edinburgh and Queensferry Tramway Company Order TCM 19/6/1905

building along the Queensferry Road and so the area remained undeveloped until the rise of car ownership in the 1920's and 1930's. It is of value to note in passing that the only areas to emerge in lands totally divorced from tramway communication, apart from the suburbs of Blackhall and South Portobello, were Craigmillar, Sighthill, Pilton and Lochend - all municipal housing estates.

The tramcar rarely pushed beyond the housing frontier, unless it was linking up to some outlying village, but by following the frontier it liberated the land beyond the terminus to further development.

This spatial approach to verifying the tramway/suburb interaction is supported by the statistical evidence available. Graph 7.10 compares tramway passenger changes per annum and a house building index for Edinburgh and Leith over the period 1880-1912. Again, when account is taken of the extraneous variables of weather, unusual traffic generating activities such as International Exhibitions, and conversion disruptions, there is an identifiable correlation between patronage and building, the building index leading the patronage by some two to three years.

In the interim the new suburbanite was asserting his travel habits and the company were optimising their traffic operations.

A final and vivid proof of the tramcar's powers of influence came in the 1906 Royal Commission on London

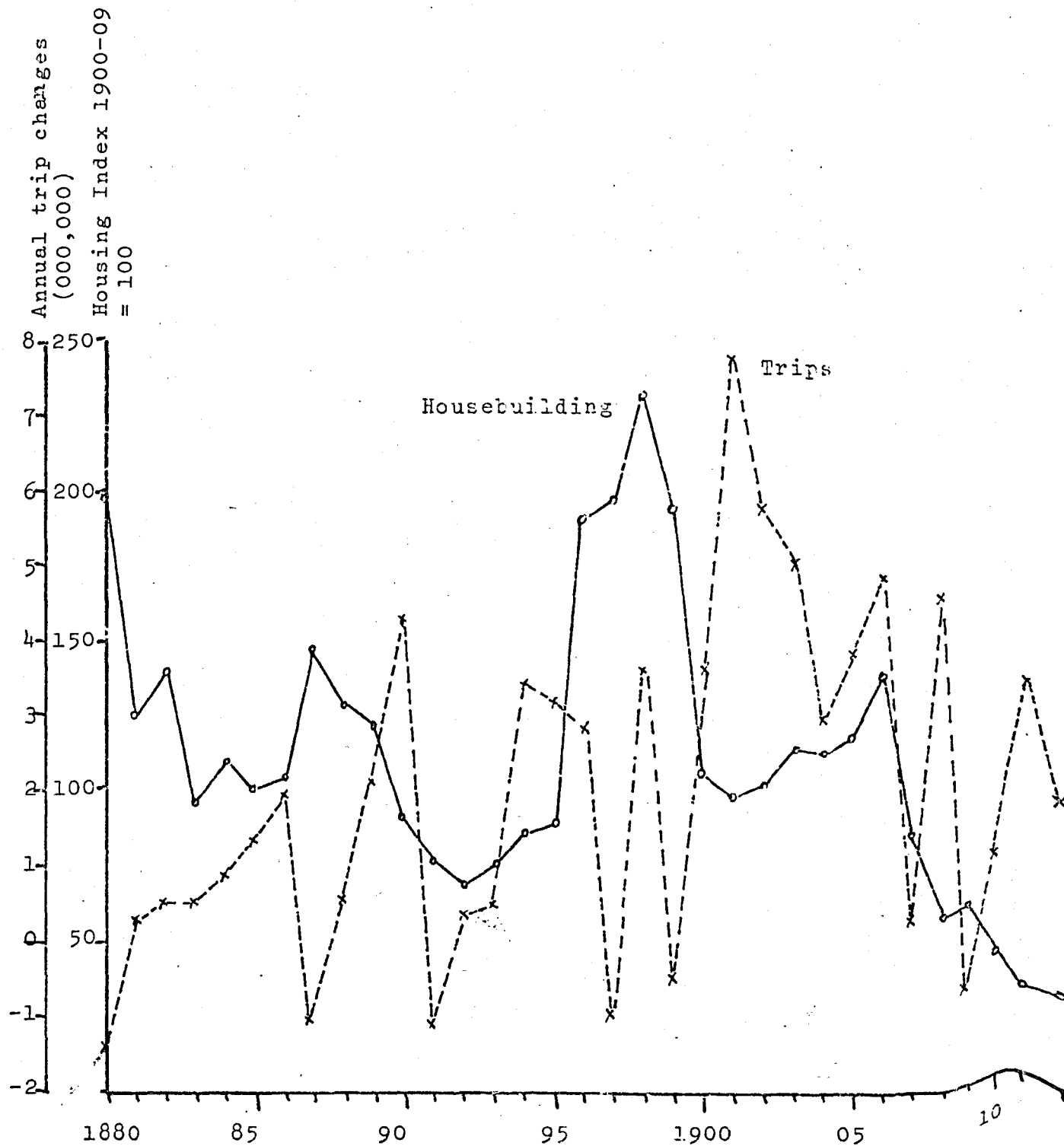


Figure 7.10 Edinburgh and Leith: Housebuilding and Tramway Changes 1880-1912

Sources: Building Index R. Rodgers Edinburgh University PhD Thesis in Process (Reproduced by his Kind Permission).
Tramways. Board of Trade Tramway Returns:
Duncan's Tramway Manual: Company Reports

Traffic. The recent growths of the like cities of Edinburgh and Dublin were contrasted: the electric tramways of Dublin were producing suburban sprawl while the demand-intensive cable cars of Edinburgh were keeping the city very compact.¹

The aim of this chapter is to emphasize the interrelationship of suburban growth and urban road transport. The emergent model explains the process in terms of social pressures, local politics and profit motives. What is of interest is that the model survives the rigours of actual urban morphology despite the omission of suburban railway influences. Quite simply, outwith the London area, few cities were large enough to justify urban railway operations. Prior to 1920 urban commuting distances were well below the range of the railways's terms of service standards. Any trip can be divided into three time sets; the access time, that is the time taken to reach and board the travel mode; the travel time, or time spent on the mode; and the egress time, the time spent from leaving the mode to actually reaching the ultimate destination. The shorter the trip to be made the more important become the trip-end times and thus the more attractive becomes the ubiquitous and hail-stop tramcar in contrast to the train with its limited number of finite stations and few central area distribution points.

¹ Royal Commission on London Traffic PP 1906 vol 42 App J Diagrams 12 and 13 comparing Edinburgh over the period 1885-1905 with Dublin from 1870 to 1905

On the topic of travel time again the railway had little advantage. The higher capital expense of railways made radial routes totally uneconomic with only circular lines holding out any promise of sufficient passenger demand. This resulted in the railway offering a longer route to the centre for the average suburban dweller than did the tramline, so that, although the train might have been faster, it had further to go. Even this speed advantage should be questioned; the frequency of stations never allowed the train to achieve any markedly superior running times.

If one were to argue that such railways were a dynamic element in urban growth then one has to explain why the majority of suburban stations remained where they were while the housing frontier moved further and further away from them.

Such was the situation in Edinburgh. The Edinburgh Suburban and South Side Railway was opened during the late 1880's and thus for a start, did not exist when the suburban mechanism came into force in the 1870's under the sole influence of the tramcar (see Map for periods 1 and 2). Its circular route put the suburbs of Morningside, Grange and Newington in anything but direct contact with the city centre. The earlier new line from Edinburgh to Leith, opened in 1868, was also non-direct compared with the tramline running down Leith Walk. The train services to

Portobello came in for much criticism once the tramways were opened; prior to 1871 the North British and Caledonian Railway Companies had no other serious opposition on their semi-urban routes and the result was poor service standards and long journey times. In many cases the suburban passenger train had to stumble its way through a points control system which gave priority to long distance trains, freight trains and shunting engines.¹ The railway companies were slow to mend their ways, and in the 1880's the residents of Costorphine yet again sought tramway links and assured the tramway company that "many people who now travelled by train would prefer the tramway if it were possible."²

In all, a city the size of Edinburgh had a lot to gain from the tramcar, and it must be concluded in accord with Gordon,³ that the role of the railway in the city's growth was of questionable significance.

¹ See complaining letters to the Scotsman; eg 24/8/1871; 25/8/1871; 6/10/1871

² Scotsman 21/10/1886

³ G Gordon op cit p 238/9

Case Study 2 - Glasgow

By the mid-nineteenth century Glasgow was a highly industrialised city and contrasted starkly with the professional orientation of Edinburgh. A second major point of difference, though not unrelated to the first, was that Edinburgh had her New Town, Glasgow had not. The roughly equivalent area of development in Blythswood was still close to the city centre and was certainly not as remote from things as was the New Town. These two factors combined to produce a Glasgow middle class who faced serious housing problems and who had little chance of avoiding them. Because of this it was as early as 1841 that in towns like Glasgow "middle-class conscience became worried by the state of the urban working-class housing",¹ and the Metropolitan Association for Improving the Dwellings of the Industrious Classes was set up in the city. Its failure helped in some small way in the formation of the City of Glasgow Improvements Trust which was designed in 1866 to alleviate the distress of central working class housing by redeveloping the site. Unfortunately the main effects of the Trust's activities were negative; central demolition was not coordinated with rehousing policy and this lack of planning only aggravated the housing shortage emanating from concomitant railway company demolitions.²

¹ C M Allan The Genesis of British Urban Redevelopment with special reference to Glasgow Economic History Review, vol 18 1965 p 600

² J Butt Working-class Housing in Glasgow 1851-1914 in S D Chapman (ed) The History of Working Class Housing 1971 p61

The Glasgow of the middle decades was experiencing the classic central commercial explosion. In 1881 a historian of the city could look at "places of business, which, at the beginning of the century, only required a few streets in the vicinity of the Cross" and see them "now spread over a greatly extended area; the resident population is being driven to the outskirts of the city; and what were once dwelling-houses have now been turned into gigantic warehouses".¹

Adding to this pressure, residential designs for western parts of the city received a severe setback in the 1860's when around 150 acres of river frontage were taken over as shipyards.² But, against this mounting demand for space in Glasgow, Tarn's statement that the Trust's "redevelopment proceeded painfully slowly; this should be emphasised" rings false until one considers his complementary observation that "so long as the problems of industrial growth did not affect the solid middle class voter, vested interest stood in the way of progress".³ What this means is that sometime in the later 1860's and

¹ G MacGregor History of Glasgow 1881 p 515

² J R Kellett Urban and Transport History from Legal Records; Glasgow Journal of Transport History vol 6 1963/4 p 226

³ J N Tarn Housing in Liverpool and Glasgow Town Planning Review No 39 Jan 1969 p 329

⁴ ibid p 320

1870's the middle classes were able to both escape from the housing pressures and disassociate themselves from the city's troubled heart.

Glasgow's statistician of the period, James Nicol, provides the answer; "The inauguration of our admirable tramway system, in 1872, has been an important factor in promoting and fostering the spread of the inhabitants, by providing easy and inexpensive means of locomotion between the centre of the city and its extremities"¹. The point at issue is, which inhabitants? There is no doubt that the Glasgow working man made good use of his tramcars.

Repeatedly the tramway managing director referred to him as "our mainstay"² and emphasised that "the class of people who travel on the tramways in Edinburgh are very different from those who travel on the tramways of Glasgow"³. Under the terms of its lease the company had to run workmen's cars, at half-fare, between 5 and 7 o'clock in the mornings and evenings. This generated much working class travel, but only over the short half-penny fare stage distances. This fare structure allowed the working man to use the tramcar yet not become dependent on it; tramways

¹ J Nicol Report upon the Vital, Social, and Economic Statistics of Glasgow 1881-85 1885 p 2

² Glasgow Herald 5/8/1878

³ ibid 25/7/1882

⁴ See Tarn op cit; 'living in the suburbs was attractive to the artisan because the journey to work was still short and could be done on foot'. p 330

may have saved the worker some time or some effort, or allowed him to widen his job opportunity area, but they did not remove his home far from the central industrial areas.

In Edinburgh class division within the transport environment revealed itself in the form of users and non-users; in Glasgow it appeared as short-distance and long distance passengers. Within a year of operation the city council considered it "a great public convenience if, at the close of the day, cars could be run to the Crescents, the Botanic Gardens and Dennistoun, at the full rate due for the whole journey" so as to guarantee seats for the suburban commuters. "It is also not doubted that on some routes cars, at an exceptional rate of charge would be found, at certain hours of the day, to suit the convenience of travellers more especially of ladies coming into town from the outskirts or returning home."

It was these long-distance travellers, the residents of Hillhead, Crosshill and Partickhill who were becoming dependent on the tramcar in their quest for the good address. Even the Kirk had to come to terms with the drop in collections that this outward migration was causing: in 1879 the Church of Scotland shifted its ground to support the running of tramcars on Sunday because of the changes in society, only to be sharply criticised by one of its own number who saw "the only change in the 'exigencies' of modern society bearing on the present point to be the

removal of the residences of a considerable number of the wealthier classes to the suburbs".¹

The Hillhead businessmen accepted the tramcar as part of their new life style, leaving home every morning at eight-thirty to catch a tram to the city "some running after a tramcar and nimbly boarding it, without troubling the horses to stop, others making up their minds to walk into the city for the good of their health".² The West End was creating the real commuter so that "in the morning there is the same stream of men moving to business in the city, in the evening the same stream returning to home and dinner and comfort".³ By the close of the century Glasgow had its "villadom" - "clerkdom" it had been unfeelingly designated by a cutting scribe - forming a close and ever-growing barrier between the city proper and 'the country' ".⁴ It had also had an immense working class housing problem, partly as a result of the tramway market's division by income. Even the Corporation policy of lower fares after 1894 did little to alter the situation. Statements made in the early 1900's that " the tramways were taking out of the city to the country the wealthiest ratepayers", a

¹ Rev D Pirret The Sabbath, the Tramway Cars, and the Glasgow Presbytery of the Church of Scotland 1897 p8

² J J Bell I Remember 1932 p27

³ J H Muir Glasgow in 1901 1901 p249

⁴ Glasgow Herald 20/8/1898

⁵ ibid 6/2/1903

view supported by the Ratepayers' Federation who viewed such moves with financial discomfort,¹ were complemented by those of others who realised that the working class could not afford the expense of travelling.² This whole discussion over the effectiveness of the tramcar came to a head in the Municipal Commission on the Housing of the Poor which reported in 1904.

The Commission heard how "the migration to residences in the country is only in the middle class and not in the labouring class" and that the reasons for this were the cost of travelling and lack of job opportunity for family members. The Commission were also told that the move to the suburbs had little economic justification, since cheaper outskirts land prices were offset by tram fare costs. In 1904 the ground rent on a suburban plot at 10/- a square yard was 1.25d per week and the equivalent weekly rent on a £5 per square yard central plot was 12.5d. The savings would be more than eaten up in fares to and from the former site. On purely financial grounds

¹ ibid 29/12/1903

² W Smart Discussion on Housing Problems 1902 p 18

P Fyfe Backlands and their Inhabitants 1901 p 37

³ Glasgow Corporation Municipal Commission on the Housing of the Poor 1904 Q 4356

⁴ ibid Q 819/20

⁵ ibid Q 6513 and Q 6665

suburban living was not a cheaper alternative to urban living, and in fact, it exacted cost in return for fresh air, greenery and privacy. Finally one witness made the startling revelation that because the better-off were being lured into the country, the tramcar by vacating central dwellings, was allowing many of the working class to live in the city for the first time.¹

The general conclusion of working class overcrowding was echoed in the Parliamentary Commissions of 1906 and 1908; the former were told that the artisan and labourer were not moving while "those persons who do not require to be at work until after 8 am appear to be gravitating into the suburbs",² and the latter found that the cheaper houses were "mostly in closest proximity to areas of factories, mills and workshops".³ The more publicised annual accounts of the municipal undertaking dispelled the myth of the working class tramcar which had been perpetrated by the previous company, no doubt for good public relations. In 1904 only 20% of the half-penny fares were workmen's tickets; the main low fare passengers were businessmen moving about the city centre.⁴ By 1909

¹ ibid Q 11294

² Royal Commission on London Traffic op cit App J Table 11

³ Report on Cost of Living of the Working Classes; cmd 3864 1908 p 531

⁴ TCM 20/1/1904. General Manager's Supplementary Report on Half-penny Fares. See also GM report on Fares TCM 29/5/1907

the developmental attributes of tramways, whether electric or horse, had been fully appreciated. In that year an official publication spoke of caution in the planning of further extensions into the surrounding countryside; "it is said that population follows the cars, but this only applies to villa and other residents whom it is profitable to retain in the city. The wage-earner follows the shop, factory and shipyard"¹. A tramway brochure of 1904 ably summed up the impact of the tramcar on the masses when it suggested that "the toiling masses of Glasgow are indebted to the Corporation for the provision made for pleasant little trips into the country"². This combination of middle class migration and working class inability to move forced Bremner in 1906 to reiterate one Mrs R C Phillimore who thought it "socially immoral" for people who could afford to live in the suburbs to remain in the centre.³

¹ Our Tramways 1909 p 12

² Glasgow from a Tram-car Top 1904? p 124

³ R L Bremner The Housing Problem in Glasgow 1906 pp23/25 See also General Manager's Report on Extensions TCM 24/3/1908. It was frequently stated that the tramways had caused 15,000 homes in the city to stand empty, but of those almost 14,000 were of three rooms and a kitchen and smaller. "It is, therefore, quite evident that the tramways can be held responsible only to a very small extent for the large number of empty houses in the city, as it is wellknown that remarkably few people occupying houses of three rooms and a kitchen and under have removed beyond the city limits on account of the travelling facilities provided by the tramways."

By 1914 then, the tramways were providing a service for the whole community. To the better-off they were a means of escaping daily from the central chaos and to the less well-off they were a means of escape at weekends. The demands of the latter section of the community, although of an individual marginal nature did amount to a considerable revenue flow to the undertaking, but this was more of a bonus over and above the basic revenue earning functions of commuting and intra-city business calls.

That the tramcar's demand was divided into two distinct socio-economic groups explains the contradictory position of the city after the war. It had the worst housing situation and one of the biggest and cheapest tramway networks in the country. The contemporary panacea of municipal outskirt housing schemes was taken up with great vigour, but unfortunately there was little liaison between the housing and transport executives.¹ The blame for this rests fairly on the myopia of the tramways committee. Early in 1920 the Director of Housing invited transit ~~link~~ proposals for the new planned estates of Kennyhill and Riddrie, but the tramway committee dismissed such pre-demand building approaches.² Admittedly the tramways were having internal problems stemming from high wages and rising capital costs, but the committee were allowing such

¹ T Brennan Reshaping a City 1959 p 41

² TCM 14/1/1920 and 17/3/1920

matters to blur their long-term appreciation of what public transport was all about. The outcome was the isolation of transport and housing decision making processes, and the introduction of the less capital-intensive bus to meet the needs of estate dwellers as they arose.¹

The history of middle-class domination of the Glasgow tramcar as here described has been based almost entirely on individual subjective accounts and analyses. Objective housebuilding statistics and geographical data cast no doubt on its validity. Map 2 shows the suburban growth of Glasgow in decennial intervals and the quinquennial extensions of the tramway system.

Glasgow of 1865 covered an area stretching from what is now Kelvingrove Park in the west to Camlachie in the east, and north and south boundaries were in Port Dundas and Gorbals respectively. The 1865-75 decade had its major growth areas in Dennistoun, Crosshill, Shawlands, Pollockshields, and in the north-west Govan expanded considerably in this period. The following decade, 1875-85 (2) was very much the decade of west end expansion, especially at Hillhead,²

¹ See J Dalrymple in Transactions of the Old Glasgow Club vol 6 No 1 1928/9 p 17

² M Simpson Urban Transport and the Development of Glasgow's West End 1830-1914 Journal of Transport History vol 1 no 3 Feb 1972 p 150

although the railway suburb of Pollockshields maintained its building momentum. The 1885-95 decade (3) produced a wide building spectrum with working class building in Dalmarnock, Govan and Partick, and yet the more prolific constructional areas remained in Hillhead, Langside and Dumbreck. By 1895 then the pattern of suburban growth is only too clear; middle class housing was pushing outwards while new working class areas were tied to the shipyards, railway yards and foundries.

The next twenty years, 1895-1915 (4 & 5) show no deviation from this trend, with the major building coming in the south and west of the city with fairly insignificant additions elsewhere. By 1907 private enterprise practically stopped building cheaper houses so as to concentrate on tenement subdivision and to supply the housing needs of the 'salariat'.¹ The electric tramcar ruined the exclusiveness of the West End, with semi-detached villas and substantial tenements springing up in Hillhead, Dowanhill, Hyndland and Jordanhill; the electric tram had "permitted the petite bourgeoisie to share the privileges which had for so long been the preserve of the haute bourgeoisie, life in a pleasant and easily accessible suburb".² Simpson

¹ J Butt op cit p 74

² M Simpson op cit p 153

has summed up the commuter situation well; to the people of Partick, Maryhill and Anniesland the tramcar was largely irrelevant, but it was a boon to "members of the rapidly growing army of white collar workers who, from the late 'eighties' were able to afford new flats at 10/- to 15/- a week and a 3d ride to and from town each day provided that it took no longer than half-an-hour".¹ His analysis of Glasgow's West End applies equally well to the Shawlands and Crosshill regions in the south. Over the period 1865-1915 Map 2 clearly shows how the city sprawled west and south into residential areas, whereas the industrial east end remained compact and tight-knit. The Corporation's desire to achieve financial viability with their tramways reduced its benefits to the community as a whole and the poor in particular. "Does the piling up of a sinking fund," asked the Town Clerk in 1905, "on top of ample depreciation and the payment of liberal bonuses to the city treasury in addition to interest on its investment compensate for the loss of that which is the everyday privilege of the American citizen",² namely fresh air and space?

The vast areal expansion of the city in the inter-war years (6 & 7) testifies to the vigour of municipal housebuilding. Estates sprang up in Carntyne, Shettleston, North

¹ ibid p 159

² J Marwick Municipal Ownership of Street Railways Wall Street Journal 3/6/1905

Castlemilk, Pollock, Cardonald and Knightswood. Between the wars the Corporation built over 50,000 houses,¹ most of them located three or four miles from the heart of the city,² and most of them linked to the centre by uncoordinated private and municipal bus services.

The shortcomings of the transport undertaking, both in vehicle and fare strategy meant that the less well-off section of the community were now living in isolated estates served by high cost vehicles charging fares which were on average 80% higher than the tram fares. It was not surprising then, that by the 1930's the concept of outskirts development was being questioned. By 1939 it was realised that "the great objection to the cottage scheme is that the houses are too far removed from the centre of the city. They entail for working-class residents long and very costly journeys to places of employment". Pressure was mounting for central high-rise rehousing schemes. If tramway transport policy is to be congratulated for its beneficial effects on pre-1914 suburban extension, it must then also bear a heavy burden of guilt for the social and economic problems which emanated from the relatively transit-starved municipal estates of the interwar years and later. No tramlines ran to Pollock or Carntyne, and the estates of Knightswood and Cardonald got only one line apiece -

³ Glasgow Herald 8/6/1939

¹ Glasgow's Housing Centenary 1866-1966

² See T Brennan op cit p36/7

scanty in comparison with the comprehensive coverage given to Mount Florida or the West End.

The fact that, from the start, tramway construction in the city was directed by the corporation means that the 'suburban mechanism' as identified in Edinburgh is much weaker here. The Corporation could adopt a policy of expansion for reasons other than marginal demand increases, among them being political kudos and monopoly maintenance. Notwithstanding, there is a strong enough relationship, especially in the tramway-to-building direction, to fully support the mechanism hypothesis.

The early line to Hillhead preceded extensive building in the area in the period 1875-85 (2), but in general the more progressive line construction policy, especially after 1896 tended to attract development into its catchment area. In the south, for example, the Kilmarnock Road extension allowed building to begin in Newlands and Merrylee, and the same applies to the Cathcart and Maryhill lines.

Only one major area of the city grew substantially without tramway connections and this was Pollockshields. Here was Glasgow's railway suburb, with both north and south Pollockshields enjoying direct rail links with the city centre. In all, however, the passenger access problem resulted in the later purely suburban railway ventures of 1887 and 1896/97 proving of only marginal significance,

with their main traffic, indeed, being in taking workers from the centre to the steel and engineering works in the surrounding towns - a case of frustrating the central housing problem rather than alleviating it.

The statistical relationship between tramways and house-building is described in Figure 7.11. Even though strong non-economic forces were at work, a correlation between the two series does emerge. Line extensions in themselves generate new traffic (as with motorways today) so that consequent housebuilding around and beyond the terminus did not instigate such a closely related passenger demand change. In Glasgow most of the citizens used the tramways to some extent so that new suburban housing areas tended to increase the length of passenger journey rather than attract new custom. It is for this reason that the most influential factor in patronage was the fare, a decrease in which made the poor make more pleasure trips and the business man more intra-city business calls.

The combination of statistical and map data support the contention that housebuilding and tramways were closely related. In Glasgow, because the tramways had other roles apart from earning dividends, the suburban mechanism operated under 'unnatural' conditions, but even so, land and building speculation were not absent. In 1878 the feuars of Kelvinside petitioned the council for an extension of their line along the Great Western Road; when the Kelvin

¹ Tramway Committee Minutes 27/6/1878

Figure 7.11. Glasgow: House Building and Tramway Patronage
Changes 1870-1900

Source: Glasgow City Council Minutes, 1870-1900, Glasgow City Council Archives, Glasgow City Council, Glasgow, Scotland.

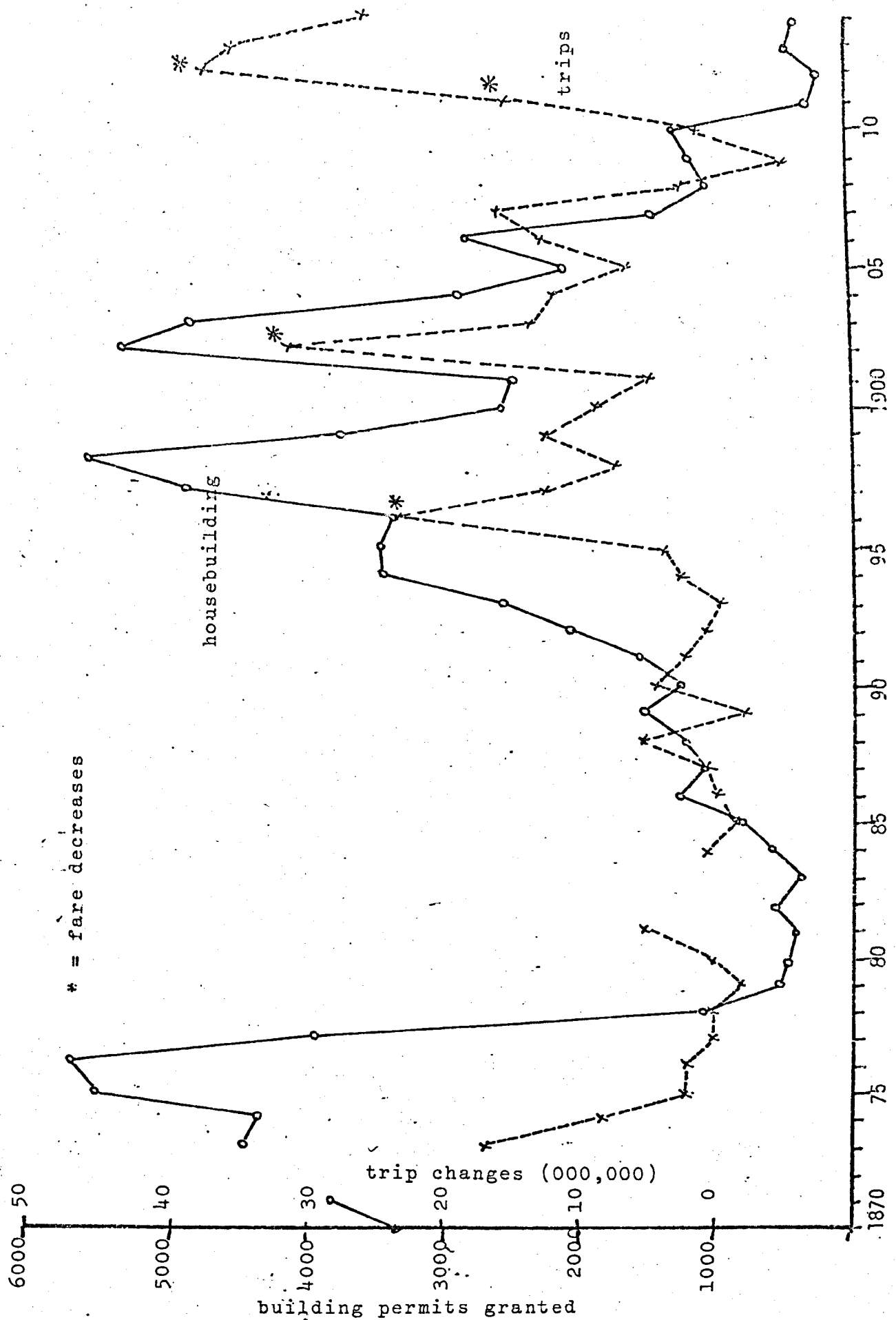


Figure 7.11. Glasgow: Housebuilding and Tramway Patronage Changes 1870-1914.

Sources: Housebuilding: A K Cairncross Home and Foreign Investment 1870-1913 1953.

Bridge toll was abolished in 1879 the tramway company agreed to the addition and as a consequence housing went up around the new terminus. (See Map 2). The Municipal Commission of 1904 was told that "large syndicates are eagerly buying up the land in districts opened up, or likely to be opened up, by the tramway system" because "speculative builders rely not so much upon any direct profits from the buildings they erect as upon the feu-duty they obtain for the land they have acquired".¹ It is of value to note in passing that in the days of company operation, in both Edinburgh and Glasgow, Lords Dean of Guild were directors of their respective tramways, James Cowans of Edinburgh and James Reid of Glasgow. It would appear that to be in housebuilding implied a strong interest in transport strategy.

Prior to 1914 the housebuilding and transport functions remained firmly differentiated into the respective realms of private enterprise (we are discussing middle class housing) and local authority. This meant that it was in the private developer's interest to get the best transit links for his area so as to optimise house prices, land sales or rents. After 1918 the major housebuilder was the transport operator; there was little incentive to optimise transport facilities. The Corporation-qua-transport

¹ Municipal Commission 1904 op cit Q 13175

operator faced a captive market of thousands of non-car-owning workers stranded in the suburbs; the Corporation-quahousing developer had no opportunity to capitalise on enhanced land values if optimum links were effected. In addition, the pre-1914 set-up meant the municipal expenditure resulted in increased rateable values, while after 1914 both transport and housebuilding activities were competing for the same limited resources.

The first serious attempt to link tramway development and housebuilding on a national scale was carried out by Isard in 1942.¹ He looked at forms of land transport in America over the years 1830-1930, and assigned to the electric tramcar the encouragement of the building activity over the first twenty years of this century; "This mode of transport achieves its effects upon building by removing the prohibitive time and cost considerations of residential location in suburbs and outlying territories".² In Britain only H H Gordon at a meeting of the Royal Statistical Society in 1918 has ventured to suggest strong causal links between the introduction of the horse and electric tramcars and their respective building booms of 1876 and 1901.³ Although his suggestions were quickly suppressed, the evidence of this chapter rallies strongly to his support.

Not until the detailed suburban mechanisms of every major town in the country has been described can we look at the concept at a national level. Nevertheless, in the interim there are two proxies which can be called

¹ W Isard, Transport, Development and Building Cycles Quarterly Journal of Economics vol 57 1942/3 pp 90-112 and Isard A Neglected Cycle: the Transport-Building Cycle Review of Economics and Statistics vol 24 1942 pp148-158; See also D Ward A Comparative Historical Geography of Street-car Suburbs in Boston Mass. and Leeds England 1850-1920 Annals of the Association of American Geographers vol liv 1964 pp477-89

² W Isard Quarterly Journal of Economics 1942/43 op cit p105

³ H H Gordon in discussion on J C Spensley's paper Urban Housing Problems in Jour of the Royal Stat Soc vol 81 1918 pp225-7

upon to augment the statistical and geographical proofs produced for Edinburgh and Glasgow. For one, national tramway statistics can be compared with a national housebuilding index, and for another, the growth of municipal areas over time can be viewed in relation to major transport innovations.

Firstly then, the comparison of aggregate tramway and housebuilding data. Bearing in mind the enormous number of influences affecting both housebuilding and tramway operation - the most important being local economic conditions, political power structures, urban topography, occupational status and the type of tramway enterprise (free, public, or a mixture of the two) - not to mention the problems of aggregation itself, the most to be looked for in such an exercise is that the results do not contradict the hypothesis. Figure 7.12 shows building activity, tramway passenger annual increases and tramway line increments over the years 1865 to 1915. The immediate conclusion to be drawn is that the tramway cycle follows the building cycle with a lag of four to five years, and this suggests that the tramcar's role in urban development was strictly passive. However, this ignores the fact that the tramline influenced building activity beyond its terminus, and so, although an extension would follow up into a newly developed area, the development itself had relied on the original terminus and the anticipation of line extensions for vital communication

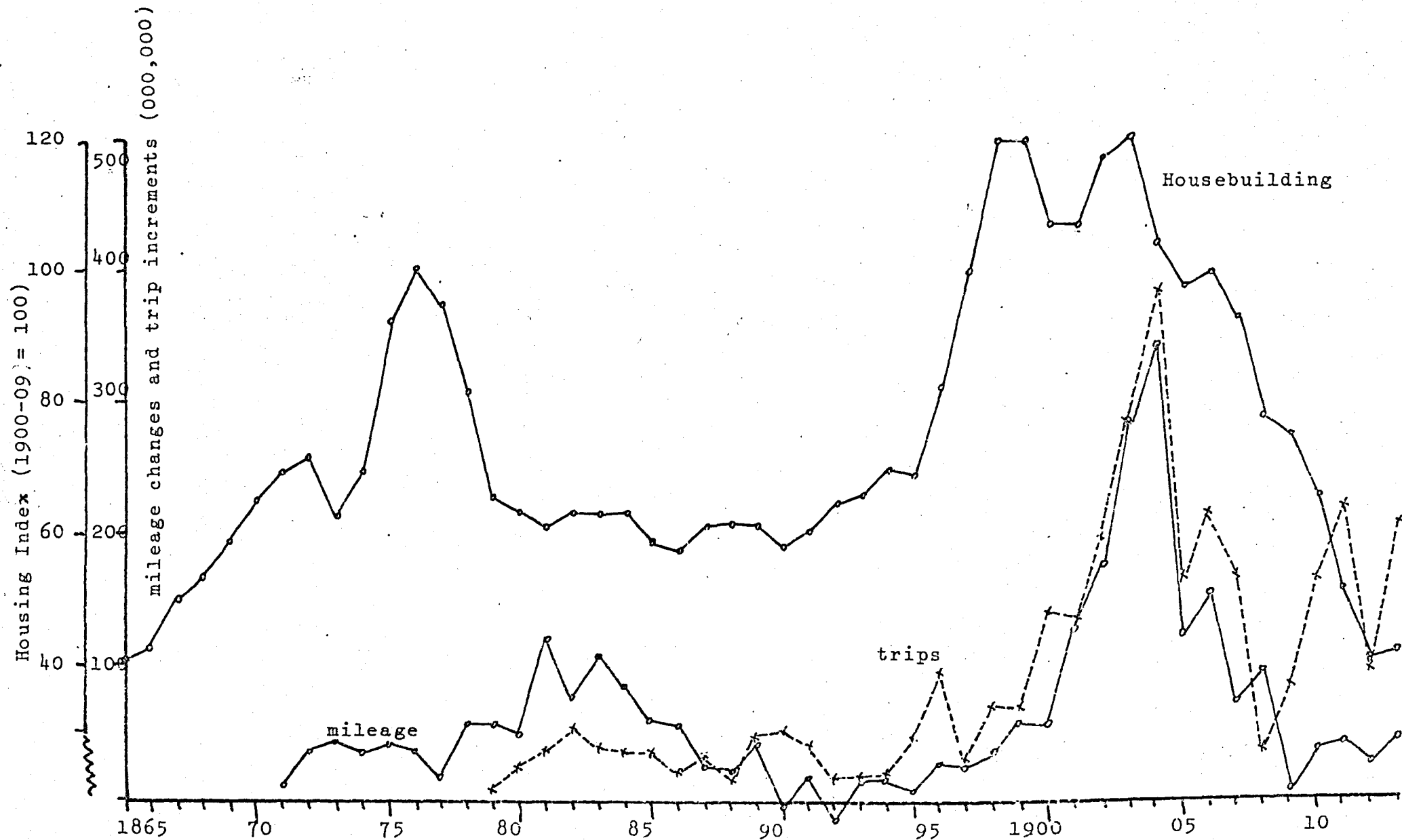


Figure 7.12. U.K.: Housebuilding and Tramways 1865-1913

Sources: Housebuilding: B Weber A New Index of Residential Construction, etc. Scottish Journal Political Economy 1955 Vol. 2. Tramways: Board of Trade Returns on Tramways

with the rest of the town. This holds true especially in the pre-1900 private enterprise period when strictly (or as strictly as possible) economic factors decided tramway construction. Figure 7.12 shows that in the early 1880's the passenger increase/line extension ratio was lower than in later years, and a possible explanation for this is that the housing boom of the late 1870's, made possible by the introduction of tramway services in the years previous to this, this boom brought many people into the tramway penumbra beyond the initial termini. Subsequent line extensions did not attract the same incremental passenger demands but merely made transit more accessible for those made tramway-dependent in the earlier years.

The 1898-1903 housing boom experienced the same tramway time lag but yet again it masks the important contribution made by the transport facilities. In the early 1890's all indices move upwards together, and the first housebuilding peak is achieved without a corresponding line building programme. Two reasons can account for this. In the first instance, line construction at this time was sacrificed at the expense of line conversion as electric traction was introduced; and in the second, the more suburban a line became, the more was the housing development per route mile that it could serve. Conversely, however, the longer a tramway route became, the more important became its attributes of cost and speed, and the inadequacies of the horse tramcar in these

respects did much to stop the building upswing in 1898. The consequent downward phase was sharply reversed in 1900 when the new, cheap and fast electric tramcar, run in the main by municipal operators seeking citywide coverage and the voters' support, broke down the distance barrier to further expansion and revived the housing boom. Here, then, is a strong interdependence between the two activities, and it is worth a final note that both indices fall after 1904 as tramway construction declined following the great burst of municipal tramway zeal in the earlier years. ¹

This aggregate statistical evidence might need some explanation before fitting itself into the general suburban mechanism, but it certainly does not disprove anything discussed above.

The second avenue of approach to a national treatment of the subject is to look at the municipal areal acquisitions of the main towns over the period in question. It is not being contended that urban transport improvements caused local councils to take over more land, but rather, that such improvements made outlying districts more amenable and liable to amalgamation with the central town, so making political and personal motives for suggesting the addition tenable. In general, a local council would only seek to extend its jurisdiction into an area if that

¹ For further discussion of the Housing Boom see chpt 3

area were newly developed or was about to be developed. Wherever transport links were an influence its catchment area became open to amalgamation bids from the town whence the transport link emanated. Opinion in Glasgow in 1889 typifies the logic of such boundary extensions; "Is it right or proper that the Municipality of this hemmed-in city should act as public carriers for all the parasite burghs that stifle her growth and grudge her breathing room?". For the same reason, Leith Town Council viewed with extreme caution Edinburgh Corporation's bid to take over their tramway undertaking in 1892, and indeed resolved the problem by extending the franchise of the incumbent tramway company.

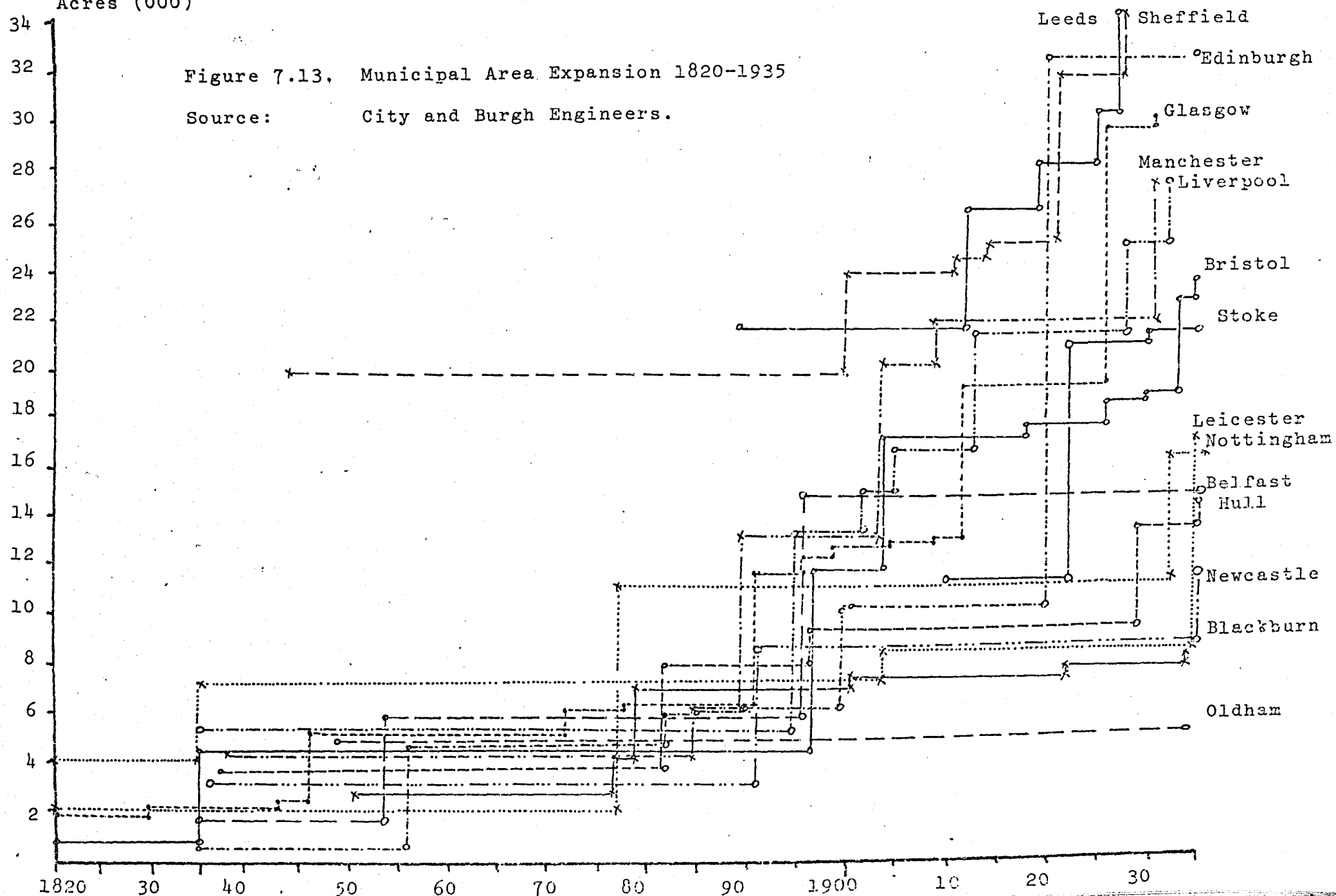
Figure 7.13 plots the municipal boundary extensions of fifteen of Britain's towns. The impression (all that is intended) is one of rapid urban growth after, say 1875, with some minor additions in the 1840's and 1850's, and some notable increases in the 1890's. Without implying any one-to-one relationship, these dates coincide with the introductions of the horse omnibus, the horse tramcar, and the electric tramcar.

These two attempts at showing the suburban mechanism to be a national urban phenomenon encourage the belief that what has been described in detail for Edinburgh and

Acres (000)

Figure 7.13. Municipal Area Expansion 1820-1935

Source: City and Burgh Engineers.



Glasgow may well have happened in all major cities of Britain. Urban growth and tramway development were interdependent activities, with this relationship only gradually weakening as the urban area expanded to such a degree that some form of suburban railway became viable, noticeably in London.

Little work has been done in the field of tramway history, I suspect for the reason that most historians have assumed that the tramcar was a working class vehicle with influences passive rather than positive. Having dispelled the passivity assumptions, the concept of the mass carrier can be swept away easily. In simple terms, the image of the tramcar has been twisted by the myth of large numbers. Many historians, like Hobsbawm,¹ have described the tramcar as democratic, largely, one feels, on the basis of their passenger carrying statistics. A good example of this is given by Jones in his history of Belfast. In 1904 the city's tramways carried 28 million passengers, and from this he concludes "the trams were a truly democratic means of travel".² In commuter terms and taking into account his statement that many lunched at home, this vast number of trips reduces itself to only around 51,000

¹ E J Hobsbawm Trade and Empire 1960 p136

² E Jones A Social Geography of Belfast 1960 p57

people, or 14.5% of the population of Belfast; this is hardly 'democratic' (although there are shades of Lord Rosebery). Of course the commuter term is the extreme case, but it does emphasise that on an annual basis, the impression given by official trip numbers and the actual number of people significantly involved is vastly different.

1 28 million trips divided by (50 weeks per year x 5 days per week x 3 journeys per day). We have used '3 trips per day' to reflect the travel patterns of those who lunched at home.

Note 7.1 Urban Population Statistics and Tramway Patronage

Throughout this chapter little reference has been given to the growth of the urban population in Britain over the period under discussion. There are two reasons for this. Firstly, transport is a derived demand and in Victorian times depended in the main on where one could live. As a result housebuilding statistics provide a more meaningful data base when analysing the demands for, and effects of, tramway operations. It becomes apparent then, that to a large extent, our definition of middle class used is that a group of people able to live in suburbs. Secondly, the decennial census figures are not sensitive enough for any useful relationships to be forthcoming. Figure 7.14 plots Law's estimates of the urban population of England and Wales¹ with their related tramway statistics. In comparison with Fig 7.12 such total urban population data tells us little other than that the underlying upward trend in urban population no doubt produces expansionary influences on tramway demand.

Tramways were used by a particular section of urban society: they did not provide a service of equal necessity to all.

¹ C M Law The Growth of Urban Population in England and Wales 1801-1911 Trans of the Institute of British Geographers vol 41 1967 pp 125-143

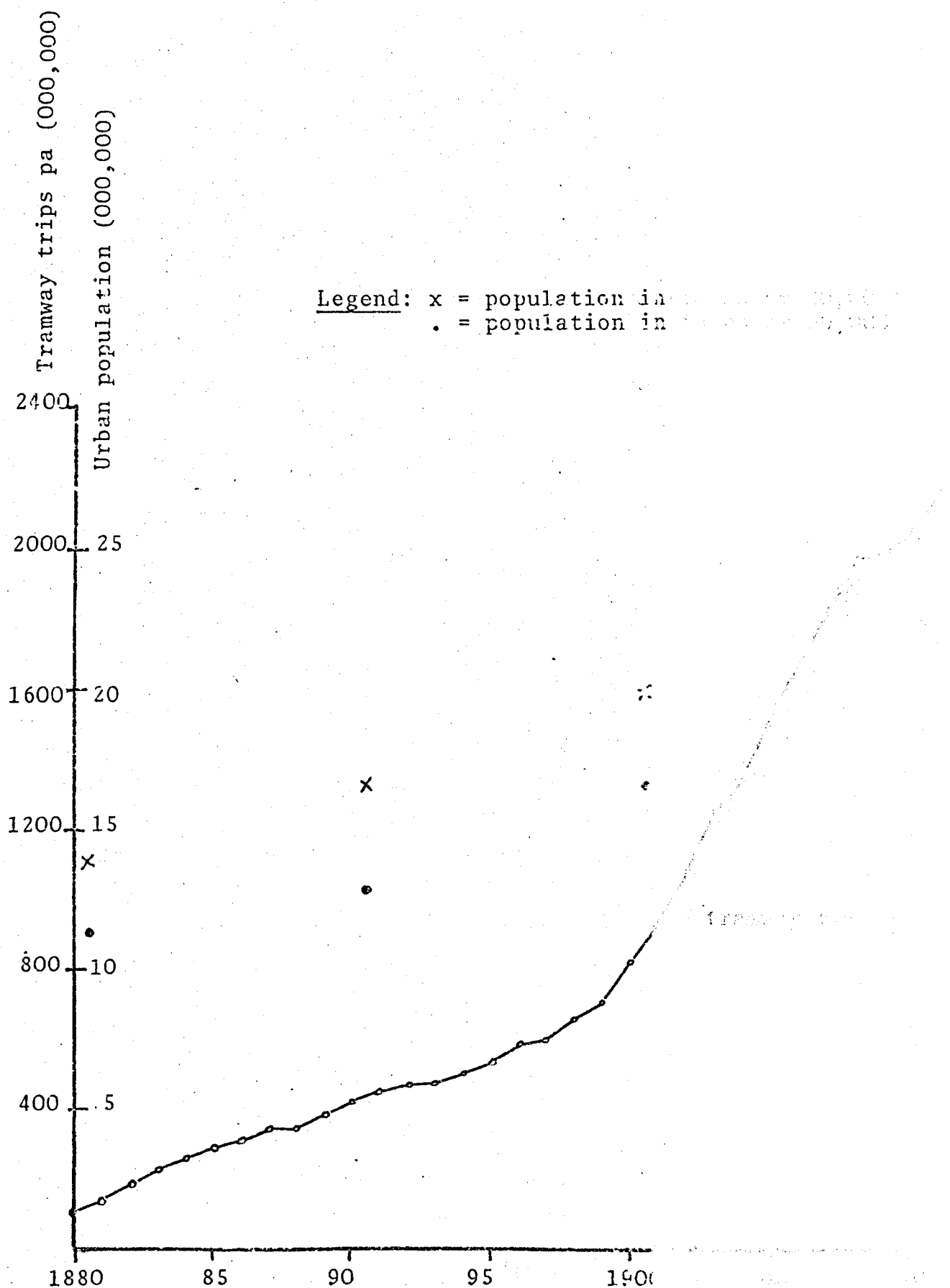


Fig 7.14 England and Wales : Urban Population and Tramway Patronage 1880 - 1911

Sources: Tramways Board of Trade Returns
 op cit p 142

Chapter Eight - Conclusions

When Matthew Arnold was writing in the 1860's, he saw fit to divide English society into three groups which correspond in general to the rankings of upper, middle and lower class. He found the cultural categories of Barbarians, Philistines and Populace suitable to his needs:¹ people could be categorised by their life-style and ambitions. When Masterman carried out a somewhat similar exercise in 1909² he broke down society into the Conquerors at the upper end and the Multitude and Prisoners at the lower end. Significantly, the middle ranks were termed Suburbans. By the early 1900's Masterman found that a new parameter in social stratification had emerged, that of spatial location. Spatial segregation of social groups had been achieved to a degree sufficient to warrant its consideration as a categorising variable.

For the majority of urban areas in Britain the tramcar played a vital, if not the vital role in the evolution of the suburb. Obviously, economic conditions and social aspirations produced the demands for suburbia, but the necessity of the home-workplace link meant that the fruition of suburban goals depended heavily on contemporary transit technology and policy.

¹M Arnold Culture and Anarchy 1869

²C F G Masterman The Condition of England 1909

Over the period of our study the power to influence and direct national and local policy spread itself downwards through the community.¹ In terms of transport policy this had the effect of introducing more and more people to the ability of formulating policy towards the achievement of their own suburban ideals. Within this framework transport technology developed almost independently whilst the policy-influencing section of the community implemented innovation when it considered that the resulting benefits of introduction outweighed the overall costs of its installation. We might have been able to class this as a form of crude cost-benefit analysis had the costs and benefits been distributed over the entire community involved. In actual fact the appraisal exercise restricted itself to the consideration of only those factors directly affecting the policy-influencers themselves. This interaction of a broadening political power base and an advancing technology controlled the speed and timing of urban transport development.

The tramcar came to Britain in 1859 and it was quickly dismissed. The policy-makers had carriages (either their own or semi-private short-stage coaches) which permitted their fulfillment of out-of-town living and they saw no need for a more comprehensive form of public transport. Anyway the thin wheels of carriages and the grooves of

¹ E P Hennock Fit and Proper Persons 1973 p 12

tramlines did not go well together on busy central streets. The next decade saw not only a marked rise in the deterrence of urban living but also a significant extension of local and national voting power. The new policy-influencers wanted suburbs and they wanted a means of getting to and from them and so they took up the horse tramcar with vigour after 1870.

By 1893 there were no major technical or legal barriers in the way of overhead electric tramway traction yet again, conversion lagged until the turn of the century. In this instance the cheap money of the 1890's encouraged extensive housebuilding which pushed the housing frontier to the limits of the horse tramcar's speed and passenger capacity. A new and rapidly expanding section of the community required transport and it is here hypothesised that there could be no new moves in transport technology until the pressure of demand of those wanting electric tramways, namely, the more distant suburbanites, outweighed the force of the 1870-1900 emigres who stood to gain relatively little from a faster transport vehicle. The political tussle manifested itself in the guise of the urban amenity problem. Until the latter group lost their primacy overhead electric traction could be dismissed as an expensive and dangerous visual intrusion. By the late 1890's the policy-influencing section, or perhaps more accurately, that portion of the citizens who felt themselves to be directly affected by transport facilities - or lack of them - had widened sufficiently

for the benefits of longer distance commuting to overcome such costs as unsightliness.

The next period of decision came in the 1920's when the policy-influencers abandoned not only the tramcar but public transport itself. The motor car altered the complexion of the policy formulation process which had grown up over the previous sixty years. In many ways the situation had reverted to that of the 1850's since to an appreciable extent transport policy makers were divorced from public transport users. For the second time the goal of public transport policy was that of complementarity with the private mode rather than efficient mass transportation. Although the motor bus had been in successful operation since the 1900's it did not leave its London base in any force until the 1920's. As a mass mover in the provincial cities the bus was a second-best solution, but given the parameters of the self-centred appraisal formula of the policy-influencers - which ranked traffic manoeuvrability as important - the motor bus emerged as the optimum vehicle.

The interwar municipal housebuilding programmes strengthened the hand of the anti-tram lobby. Such vast outskirts developments grew up as unnatural appendages between the ordered suburban extensions of the previous decades, but in the final analysis it was not their spatial abnormality which helped conquer the tramcar, but rather it was the

social composition of their tenants. Within the free market system of home location (within the dictates of income) the tramcar operated as a financially viable undertaking, but in the years following the First World War public transport was forced into a completely different operating environment with a demand source of poorer citizens living in planned estates and unable to afford the costs of commuting. The industry was expected to maintain reasonable service frequencies throughout the day but its financial remit of at least breakeven was retained. The apparent short-run cheapness of the bus held out the hope of reducing local authority commitment in what was considered to be an ailing sector of public enterprise.

The above simplistic socio-political analysis of the life of the British tramcar does at least set up a framework of understanding. But it must be emphasised that although society dictated technological innovation, the transport technology itself altered the spatial structure of urban society which in turn modified the transit needs of that society. Indeed, it may well be naive to say that society dictated technology. Rather, astute entrepreneurs such as Morris and O'Hagan made themselves expert at reading and controlling the pulse of local authority leaders and dictating influential opinion to favour their transit schemes.¹

¹For a first-hand description of the process see
H O O'Hagan Leaves from my life 1929 vol 1 pp54-78

Such men were able to reap huge profits from their shrewd handling of tramway companies finances. It would appear that the policy influencers were slow to recognise the need for improved transit, no doubt because they themselves were experiencing no problems, but that latent demand gradually amassed, as in the 1860's and 1890's, until some critical level was reached. It was at this point of crisis when suppressed demand far exceeded existing supply that the tramway promoters moved in to exploit the desires of those wanting to move into the suburbs and eager, hasty and rash enough to put money in or vote for dubious investments holding out the means of so doing.

The tramcar had an enormous impact on the growth of towns. It was no minor piece of Victoriana. The surveys of Edinburgh and Glasgow suggest that at their peak, the horse tramways of the United Kingdom gave direct employment to 48,000 people, while in the peak year of electric traction in 1919, 136,000 people were involved in the operation of tramway activities. From this observation alone the tramcar certainly demands more recognition than that given to it by Cherry who could only see it "contributing very definitely to the nostalgia of sounds and sights of bygone days".¹ At another level, the housing activity of the period under review is considered to be a major determinant of

¹ G E Cherry Urban Change and Planning 1972 p 140

contemporary economic cycles, but such housebuilding would have been impossible in its actual spatial form had there not been the transport innovations of the horse and electric tramcar. If there had been no concomitant transport progress then the housing pressures from the 1870's onwards would have been met in some entirely different way - urban uprisings, either architectural or social, the proliferation of new towns? - and towns would not be as they are today. Such a conclusion might well lead many to decry the influence of the tramcar but it does highlight the contribution made by public transport to the development of towns in the Victorian and Edwardian eras. The abandonment of the tramcar came as the result of self-centred myopia and its current absence from British and American towns explains many of the urban transport problems these countries face today.

In 1856 the Times wrote: "It is rather singular that we, who of all nations are the most fond of travel, and who pride ourselves on the facility with which we can circumnavigate the globe, do not yet know how to get from one end of our own metropolis to the other."¹ In 1972 Owen could speak of America with uncanny parallelism: "It is ironic that the nation which sent a man to the moon cannot find a way to move its workers to and from their jobs conveniently, quickly and safely."²

¹ Times 14/8/1856

² J E Owen America in a jam Scotsman 20/3/1972

The prima facie conclusion to be drawn from the juxtaposition of these observations is that the problem of urban passenger transport has yet to be solved. This thesis has tried to promote another, and more gloomy, conclusion: namely, that in the interval between 1856 and 1972 a technical solution was found, implemented and scrapped. Britain's towns have yet to enjoy the benefits of efficient public transport. When transit was efficient it was not public, and when it became public it was no longer efficient.

Table 14

Table 14-1. Data on Public Transport Patronage and Operations, 1870-1914

Year	Patronage	Operations
1870	1,000,000	1,000,000
1871	1,000,000	1,000,000
1872	1,000,000	1,000,000
1873	1,000,000	1,000,000
1874	1,000,000	1,000,000
1875	1,000,000	1,000,000
1876	1,000,000	1,000,000
1877	1,000,000	1,000,000
1878	1,000,000	1,000,000
1879	1,000,000	1,000,000
1880	1,000,000	1,000,000
1881	1,000,000	1,000,000
1882	1,000,000	1,000,000
1883	1,000,000	1,000,000
1884	1,000,000	1,000,000
1885	1,000,000	1,000,000
1886	1,000,000	1,000,000
1887	1,000,000	1,000,000
1888	1,000,000	1,000,000
1889	1,000,000	1,000,000
1890	1,000,000	1,000,000
1891	1,000,000	1,000,000
1892	1,000,000	1,000,000
1893	1,000,000	1,000,000
1894	1,000,000	1,000,000
1895	1,000,000	1,000,000
1896	1,000,000	1,000,000
1897	1,000,000	1,000,000
1898	1,000,000	1,000,000
1899	1,000,000	1,000,000
1900	1,000,000	1,000,000
1901	1,000,000	1,000,000
1902	1,000,000	1,000,000
1903	1,000,000	1,000,000
1904	1,000,000	1,000,000
1905	1,000,000	1,000,000
1906	1,000,000	1,000,000
1907	1,000,000	1,000,000
1908	1,000,000	1,000,000
1909	1,000,000	1,000,000
1910	1,000,000	1,000,000
1911	1,000,000	1,000,000
1912	1,000,000	1,000,000
1913	1,000,000	1,000,000
1914	1,000,000	1,000,000

Statistical Appendix

Section One: Data on Public Transport Patronage and Operations 1870-1914

Section Two: Data on Public Transport Patronage and Operations 1914-1939

Year	Patronage	Operations
1914	1,000,000	1,000,000
1915	1,000,000	1,000,000
1916	1,000,000	1,000,000
1917	1,000,000	1,000,000
1918	1,000,000	1,000,000
1919	1,000,000	1,000,000
1920	1,000,000	1,000,000
1921	1,000,000	1,000,000
1922	1,000,000	1,000,000
1923	1,000,000	1,000,000
1924	1,000,000	1,000,000
1925	1,000,000	1,000,000
1926	1,000,000	1,000,000
1927	1,000,000	1,000,000
1928	1,000,000	1,000,000
1929	1,000,000	1,000,000
1930	1,000,000	1,000,000
1931	1,000,000	1,000,000
1932	1,000,000	1,000,000
1933	1,000,000	1,000,000
1934	1,000,000	1,000,000
1935	1,000,000	1,000,000
1936	1,000,000	1,000,000
1937	1,000,000	1,000,000
1938	1,000,000	1,000,000
1939	1,000,000	1,000,000

Line 1000 under 1914-1939. The 1905 figure includes the 1904 and 1906 figures.

Section One

Tramway Statistics: Source. Board of Trade Returns on
Tramways and Light Railways (Street and Road) 1877-1913

Year ending mid - S	Route mileage miles	Car miles run (000's)	Passengers Carried (000,000's)	Car miles per Route mile (000's)
1876	198	-	-	-
1877	214	-	-	-
1878	269	-	146	-
1879	321	19418	151	60.49
1880	368	23842	173	64.79
1881	488	28277	206	57.94
1882	564	-	258	-
1883	671	42186	296	62.87
1884	752	46255	331	61.51
1885	811	52964	365	65.31
1886	865	54477	384	62.98
1887	886	58048	416	65.52
1888	904	60362	429	66.77
1889	949	62041	477	65.38
1890	948	65175	526	68.75
1891	963	67934	566	70.54
1892	946	70018	582	74.08
1893	960	70339	598	73.27
1894	975	71525	617	73.36
1895	982	75180	662	76.56
1896	1009	81253	759	80.53
1897	1031	84644	788	82.10
1898	1064	90594	858	85.14
1899	1122	96078	925	85.63
1900	1177	108666	1065	92.32
1901	1305	123176	1198	94.39
1902	1484	145127	1394	97.79
1903*	1772	178684	1682	100.84
ending end of				
1903	1840	194901	1799	105.92
1904	2117	227279	2069	107.36
1905	2240	244149	2236	109.00
1906	2394	266231	2455	111.21
1907	2464	282588	2625	114.69
1908	2562	292245	2660	114.07
1909	2562	297845	2743	116.25
1910	2597	310494	2907	119.56
1911	2637	323354	3127	122.62
1912	2662	334777	3220	125.76
1913	2703	354380	3426	131.11

* Lines built under Light Railway Orders now included. The
1903 figure includes lines built between 1896 and 1903

Tramway Statistics: Cost Breakdowns (pence per car mile run)
Board of Trade Returns op cit

Year ending mid	Revenue per c/m	Traffic cost per c/m	Power per c/m	Maintenance per c/m	Total working expenses per c/m
1879	14.70	3.43	5.55	1.33	12.35
1880	13.50	3.01	5.08	1.15	11.20
1881	13.30	2.79	5.38	0.99	10.52
1882	-	-	-	-	-
1883	12.57	2.48	5.35	0.95	9.96
1884	12.55	2.61	4.89	0.95	9.60
1885	11.82	2.36	4.43	0.87	8.95
1886	11.58	2.43	4.41	0.95	8.90
1887	11.57	2.37	4.25	1.04	8.86
1888	11.09	2.32	4.17	0.99	8.65
1889	11.52	2.30	4.42	0.93	8.77
1890	11.82	2.43	4.25	1.03	8.85
1891	12.11	2.57	4.46	1.03	9.29
1892	12.09	2.78	4.76	1.06	9.78
1893	12.12823	2.70	4.72	1.06	9.68
1894	12.11	2.68	4.63	0.99	9.59
1895	11.90	2.80	4.24	1.05	9.19
1896	12.25	2.77	4.11	1.16	9.17
1897	11.99	2.86	4.00	1.09	9.07
1898	12.08	2.81	4.01	1.14	9.29
1899	12.19	2.83	4.02	0.99	9.18
1900	12.01	2.98	3.75	1.00	9.00
1901	11.61	3.18	3.29	0.99	8.81
1902	11.04	3.03	2.61	1.05	7.96
1903	11.55	3.24	1.78	1.19	7.75
end of					
1903	10.59	2.97	1.64	1.08	7.01
1904	10.47	2.82	1.75	1.63	6.93
1905	10.46	2.73	1.78	1.04	6.72
1906	10.688	2.76	1.67	1.27	6.64
1907	10.567	2.74	1.62	1.18	6.62
1908	10.33	2.76	1.55	1.24	6.61
1909	10.54	2.79	1.45	1.27	6.55
1910	10.65	2.78	1.39	1.36	6.57
1911	10.93	2.82	1.38	1.36	6.62
1912	10.73	2.85	1.43	1.39	6.73
1913	10.69	2.87	1.46	1.46	6.88

Tramways: Route Mileage differentiated by prime motive power.

Year	Total	Horse/other	Steam	Electric
1876	198	198		
1877	214	214		
1878	269	263	6	
1879	321	314	7	
1880	368	361	7	
1881	488	470	18	
1882	564	531	33	
1883	671	620	51	
1884	752	661	91	
1885	811	667	144	
1886	865	666	199	
1887	886	673	213	
1888	904	678	226	
1889	949	692	237	20
1890	948	674	253	21
1891	963	681	255	27
1892	946	678	235	33
1893	960	676	248	36
1894	975	689	248	38
1895	982	681	250	51
1896	1009	694	250	65
1897	1031	733	216	82
1898	1064	679	259	126
1899	1122	536	257	329
1900	1177	436	246	495
1901	1305	341	232	732
1902	1484	303	156	871
1903	1772	312	140	1258
end of				
1903	1840	235	109	1462
1904	2117	237	106	1780
1905	2240	174	72	1994
1906	2394	144	65	2195
1907	2464	126	52	2286
1908	2562	153	49	2360
1909	2562	91	42	2429
1910	2597	88	42	2467
1911	2637	77	42	2518
1912	2662	-	-	2546

Source for steam mileage estimates.

The Board of Trade did not publish steam traction mileages until 1902, but its earlier returns did include the numbers of steam engines used on tramways since 1878.

Taking 1890 as a sample year, the ratio of steam engines to route miles on the all-steam tramway undertakings averaged 0.46 engines per route mile. In 1905 when the total steam mileage is known, the ratio turns out at 0.44, and so we have a fairly constant ratio from which to construct the pre-1902 steam mile estimates.

For the years 1897 to 1900 the Tramway and Railway World produced its steam mileage estimates, and they compare very favourably with ours:

Year	Our estimate	TRW estimate
1897	216 (probably a BoT error)	259.62
1898	259	258.17
1899	257	258.2
1900	246	245.95

The companies upon which the pre-1902 ratio is based were Gateshead, Huddersfield, North London, North Staffordshire, Rossendale Valley, Wigan, Accrington, Barrow-in-Furness, Birmingham and Midland, Blackburn and Over Darwin, Bradford and Self, Burnley and District, Bury, Rochdale and Oldham, Coventry and District, Dewsbury, Drypool and Maryfleet, Castlederg, Cavehill, Dublin and Blessington, Dublin and Lucan. These companies accounted for 54% of all steam engines in 1890.

Source for electric mileage estimates.

Again, the Board of Trade did not publish electric traction mileages until 1902. However, the Electrician published Electric Tramway Supplements from 1898 onwards - see its annual supplement tables numbers IV, V and VI. When these figures are converted from year-end statistics to mid-year ones, they correspond tolerably well with the official sources. Previous to 1898 the journal published annual electric route mile estimates in a less rigorous format, and this data has been used, in conjunction with several other varied sources - e.g. Electrical Review 18.8.1893 - to build up the electric tramway data of the early 1900's.

Metropolitan Bus Statistics.

Sources. Passengers - Report of the London Traffic Branch of the Board of Trade. 1911 PP 1911 Vol 34.

Numbers of buses. R Fulford. Five Decades of British Electric Traction 1946 p 60.

Year	Passengers (000,000's)	No. of horse buses	No. of motor buses
1903	287.4	3623	14
1904	288.9	3551	31
1905	290.7	3434	241
1906	291.6	2964	783
1907	330.0	2557	1205
1908	340.0	2155	1133
1909	311.0	1771	1180
1910	377.2	1103	1200
1911		786	1962
1912		376	2908

Most of the buses in Britain during this period were in the Metropolitan area.

Section Two.

Data for the period 1919-1938

Tramway Statistics. Source - Ministry of Transport Returns on Tramways and Light Railways (Street and Road) 1919-1939

For company data the year refers to the year-end, and for local authorities, it relates to the mid-year of the following year, i.e. 1918 refers to the whole year 1918 for companies, and the year 1918/1919 for local authorities.

Year	Route mileage miles	Car miles run (000's)	Passengers carried (000,000's)	Car miles per route mile (000's)
1918	2720	320378	4578	117.79
1919	2729	345923	4987	126.76
1920	2576	345153	4670	133.99
1921	2579	332080	4256	128.76
1922	2594	351910	4348	135.66
1923	2624	363058	4443	138.36
1924	2605	378239	4620	145.20
1925	2602	387813	4669	149.04
1926	2554	378751	4460	148.30
1927	2508	396554	4706	158.11
1928	2420	396295	4623	163.76
1929	2323	394277	4613	169.73
1930	2163	383379	4394	177.24
1931	1976	364402	4108	184.41
1932	1861	347328	3845	186.64
1933	1766	341493	3778	193.37
1934	1620	330299	3665	203.89
1935	1485	317945	3526	214.10
1936	1340	301369	3379	224.90
1937	1183	275298	3058	232.71

Tramway Statistics. Cost Breakdowns (pence per car miles run).

Source. Ministry of Transport Returns op cit.

Year	Revenue per c/m	Traffic per c/m	Power per c/m	Maintenance per c/m	Total cost per c/m
1918	18.45	5.91	2.23	3.30	13.29
1919	20.50	7.69	2.60	4.39	16.51
1920	22.75	9.11	2.94	5.51	19.72
1921	23.51	8.88	2.88	5.38	19.40
1922	21.32	7.56	2.21	4.46	16.25
1923	19.46	7.00	2.13	4.10	15.13
1924	18.23	6.86	2.56	3.68	14.43
1925	17.44	6.81	1.90	3.43	13.97
1926	17.07	6.70	2.19	3.30	14.03
1927	16.79	6.54	1.81	3.16	13.27
1928	16.40	6.47	1.71	3.10	13.01
1929	16.30	6.41	1.70	3.04	12.88
1930	15.83	6.40	1.69	3.01	12.82
1931	15.49	6.38	1.63	2.92	12.72
1932	15.18	6.17	1.56	2.85	12.31
1933*	15.62	6.03	1.62	2.62	12.16
1934*	15.47	6.11	1.59	2.60	12.14
1935*	15.32	6.16	1.57	2.64	12.22
1936*	15.25	6.23	1.58	2.54	12.23
1937*	15.46	6.40	1.66	2.56	12.53

* In these years the data refers only to those undertakings outside the control of the London Passenger Transport Board.

Basic LPTB data is given below.

Year	Miles	Car miles run (000's)	Passengers (000,000's)
1933	327	102042	1003
1934	324	101892	1013
1935	284	99248	983
1936	226	88643	904
1937	175	74553	701

Trackless Trolley Statistics. Source. Ministry of Transport
Returns on Trackless Trolley Undertakings. Combined in
Tramway Returns op cit

Year	Route mileage	Miles run (000's)	Passengers carried (000,000's)
1918	43	849	7.25
1919	42	942	7.86
1920	41	1276	10.63
1921	47	1374	9.88
1922	47	1602	11.80
1923	54	2189	18.44
1924	57	2670	24.26
1925	68	3682	33.70
1926	87	5093	50.38
1927	111	8323	80.11
1928	132	10456	99.06
1929	168	13671	127.46
1930	193	16065	151.78
1931	255	19739	184.37
1932	279	24145	221.07
1933	330	27313	254.32
1934	367	34397	337.75
1935	442	44661	445.51
1936	537	62017	632.41
1937	643	82617	864.85

Trackless Trolley: Cost Breakdowns (pence per vehicle
mile run) 1923-1932, Source op cit.

Year	Revenue per v/m	Traffic per v/m	Power per v/m	Maintenance per v/m	Total per v/m
1923	14.09	5.99	1.57	3.53	12.96
1924	14.27	5.88	1.54	3.04	12.10
1925	13.96	5.90	1.66	2.71	11.86
1926	13.49	6.05	1.79	2.38	11.78
1927	14.30	5.67	1.65	2.20	11.01
1928	14.16	5.48	1.55	2.26	10.59
1929	13.83	5.27	1.56	2.16	10.20
1930	13.84	5.35	1.63	2.19	10.42
1931	13.44	5.27	1.53	2.08	10.06
1932	13.41	5.23	1.59	2.01	10.14

Urban Bus Statistics. 1916-1937

Before 1931 there are no figures on vehicle numbers or bus patronage, but certain returns do allow a fairly accurate estimate of these series to be drawn up. Since we are concerned with urban transport we shall concern ourselves only with those buses with a seating capacity of 26 +. Coaches and charabancs are not regarded as public transport vehicles in our meaning of the term. The numbers of such 26 + buses was 17,516 in 1927, 20,259 in 1928 and 23,693 in 1929. Source - Ministry of Transport Census of Mechanically Propelled Road Vehicles 1927-1929.

From the series of public service vehicles in operation presented below, the ratio of 26 + seat buses to the total national fleet of buses is approximately 55% for the three years in question. If we extend this ratio over the whole period we can estimate the number of buses carrying out purely passenger transport duties.

Year	Total number of public service vehicles. Source - <u>Motor Transport</u> <u>Year Book.</u>	26 + bus estimate	Local authority buses. Source - <u>MTYB</u>	Local authority bus patronage (000's) Source - <u>MTYB</u>	Total bus patronage (000's)
1916	5332	2932	177	-	468709
1917	5735	3154	198	-	504198
1918	4649	2556	226	-	408602
1919	5826	3204	243	-	512191
1920	8083	4445	500	-	710577
1921/22	11586	6372	649	-	1018628
1922/23	13955	7675	684	-	1226925
1923/24	17100	9405	781	-	1503483
1924/25	21557	11856	1011	-	1895300
1925/26	24409	13424	1294	214793	2228270
1926/27	25763	14169	1705	271737	2258206
1927/28	30138	16575	2564	395380	2258206
1928/29	36503	20076	3568	570424	3209994
1929/30	42238	23230	4172	704099	3920474
1930/31	43991	24195	5049	863143	4136214

The estimates for the period 1916 to 1925 for total bus patronage are based on the average passenger per bus ratio for the following four years, namely 159,860 passengers per bus per annum. These estimates will tend to be on the high side since the earlier buses were smaller than those of the later twenties. The estimates for the period 1925 to 1931 are simply the local authority data grossed up by the factor total buses: local authority buses.

From 1931 onwards the Traffic Commissioners published annual statistics, but these include buses with seating capacities down to eight per vehicle. These smaller buses accounted for some 7% of the total bus fleet, and so the official figures have been deflated by 7% to produce a more accurate estimate of the patronage for urban bus transport.

Bus Passenger Statistics. 1931-1937. Source - Annual Reports of the Traffic Commissioners

Year	Passengers carried (000's)	Revenue per b/m	Total expenses	Total expenses per b/m on all			
				Repairs	Depreciation	Traffic	Petrol
1931	4,822,734	10.50	-	-	-	-	-
1932	4,894,718	10.41	-	-	-	-	-
1933	4,966,631	10.53	-	-	-	-	-
1934	5,241,276	10.65	11.64	+ 3.38 +		4.75	1.91
1935	5,524,034	10.72	11.49	1.80	1.39	4.82	1.90
1936	5,884,100	10.84	11.57	1.80	1.38	4.94	1.88
1937	6,096,675	11.00	-	-	-	-	-

For other bus passenger estimates see:

E J Broster. An Economic Study of the Growth of Travel in Great Britain 1903-1933. London School of Economics thesis number X 20,484 1936 (?).

J R Stone & D A Rowe Measurement of Consumers' Expenditure in the United Kingdom 1920-38 1954 vol II pp 60-72

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PRIMARY SOURCES

The main primary sources consulted were the Minute Books of the Tramway/Transport Committees of the Corporations of Edinburgh and Glasgow over the period c 1870 - 1960. These sources were complemented by the General Minute Books of the Town Councils, Corporation Department Accounts and Municipal Transport Undertakings' Annual Reports. For information on the early tramway companies little remains apart from Scottish Record Office files (see below) and reports in the press. The archives in both Edinburgh and Glasgow City Chambers hold many miscellaneous documents and maps relevant to planning and policy programmes.

PARLIAMENTARY SOURCES

Abbreviations used:

- SC Select Committee
- JSC Joint Select Committee
- RC Royal Commission
- HLSC House of Lords Select Committee

SC on the Hackney Coach Office
PP 1830 vol X

Second Report on the State of Large Towns and Populous Districts
PP 1845 vol XV111

SC on Metropolitan Communications
PP 1854/55 vol X

SC on Metropolitan Turnpike Roads
PP 1856 vol XIV

Seventh Report of the Medical Officer of the Privy Council
PP 1865 vol XXVI

SC on Tramways (Ireland) Acts Amendment Bill
PP 1866 vol XI

Eighth Report of the Medical Officer of the Privy Council

1865

PP 1866 vol XXX111

RC on Railways

PP 1867 vol XXXV111 pt 1

Board of Trade Report on Tramway Bills

PP 1867/68 vol LX11

PP 1868/69 vol LIV

SC on Tramway Bill

PP 1870 vol X

Proceedings under the Tramways Act 1870

PP 1871 vol LX

JSC on Tramways (Metropolis)

PP 1872 vol X11

Reports respecting Tramways in Foreign Countries

PP 1872 vol L11 cmd 500

JSC on Railway Company Amalgamation

PP 1872 vol X111

SC on Locomotives on Roads

PP 1873 vol XVI

HLSC on Horses

PP 1873 vol XIV

SC on Railway Passenger Duty

PP 1876 vol X111

SC on Tramways (Use of Mechanical Power)

PP 1877 vol XVI

SC on Tramways (Use of Mechanical Power) Bills

PP 1878 vol XV111

HLSC on Tramways

PP 1878/79 vol XIV

SC on Tramways (Ireland) Acts Amendment Bill

PP 1881 vol X11

SC on Artisans' and Labourers' Dwelling Improvement Acts

PP 1881 vol VII

Report of SC on Artisans' and Labourers' Dwellings Improvement Acts

PP 1882 vol VII

RC on the Housing of the Working Classes (1)

PP 1884/5 vol XXX cmdnd 4402

SC on the Housing of the Working Classes (11) Scotland

PP 1884/5 vol XXXI cmdnd 4409

JC on Electric and Cable Railways (Metropolis)

PP 1892 vol XI

JSC on Electric Powers (Protective Clauses)

PP 1893/94 vol XI

JSC on Municipal Trading

PP 1900 vol VII

JSC on Housing of the Working Classes

PP 1902 vol V

JSC on Municipal Trading

PP 1903 vol VII

SC on Workmen's Trains

PP 1905 vol VIII

RC on London Traffic

Evidence in PP 1906 vol XLII cmdnd 2987

RC on Motor Cars

PP 1906 vol XLVII cmdnd 3080/3081

SC on Housing of the Working Classes Acts Amendment Bill

PP 1906 vol IX

Report on Cost of Living of the Working Classes

PP 1908 vol CVII cmdnd 3864

Report of the London Traffic Branch of the Board of Trade

PP 1911 vol XXXIV

SC on Motor Traffic

PP 1913 vols VIII and IX

RC on the Housing of the Industrial Population of Scotland,
Rural and Urban

PP 1917/18 vol XIV cmdnd 8731

Second Report of the SC on Transport

PP 1918 vol IV

SC on Tramways (Statutory Requirements)

PP 1918 vol IV

Report on Building Construction in Connection with the
Provision of Dwellings for the Working Classes (Tudor-Walters)

PP 1918 vol VII cmdnd 9191

SC on Transport (Metropolitan Area)
PP 1919 vol VII

Report by a Court of Inquiry into the Dispute in the
Tramways Industry
PP 1921 vol XIV

RC on Transport First Report
July 1929 cmnd 3365

RC on Transport Final Report
PP 1930/31 vol XVll cmnd 3751

Observations on the RC on Transport
PP 1931/32 vol XX cmnd 4048

Tenth Annual Report of the Department of Health for Scotland
PP 1938/39 vol XI Appendix 2

RC on the Distribution of the Industrial Populations
PP 1939/40 vol IV

Board of Trade/Ministry of Transport Tramway and Light
Railway (Street and Road) Returns
PP 1876 onwards

Annual Reports of the Traffic Commissioners
1931 - 1938

Hansard
1860 onwards

PUBLIC RECORDS OFFICE (PRO) FILES

Memorandum of Association of the Metropolitan Tramway Co Ltd
1865 BT 31/1194

Articles of Association of the Liverpool Tramway Co Ltd
1865 BT 31/1197

SCOTTISH RECORDS OFFICE (SRO) FILES

Edinburgh Tramways Co Ltd
BT 2/2584

General Property Investment Co Ltd
BT 652

Edinburgh and District Tramways Co
BT 2/2638

Property Investment Co of Scotland Ltd
BT 2/606

Trinity Lands Co
BT 2/665

Glasgow Tramway and Omnibus Co Ltd
BT 2/367

Stirling and Bridge of Allan Tramway Co
BT 2/414

Dundee Tramway and Carriage Co
BT 2/778

Dundee Tramway and Omnibus Co
BT 2/497

Edinburgh Suburban and South Side Railway Co
BR/ESS/1/1

Edinburgh Street Tramways - Parliamentary Proceedings
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1899-1947 London

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1919-1946 London

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1877-78 London

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London

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1866 onwards London

Herapath's Railway Magazine and Commercial Journal
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KEY TO MAPS 1 AND 2

The areas of the maps within the 1940 housing boundaries which are unshaded comprise two types:

- those areas built before 1865 eg the central core, pre-1865 self-contained villages
- those areas where building proceeded so slowly that it is unrealistic to allocate their growth eras to specific decades

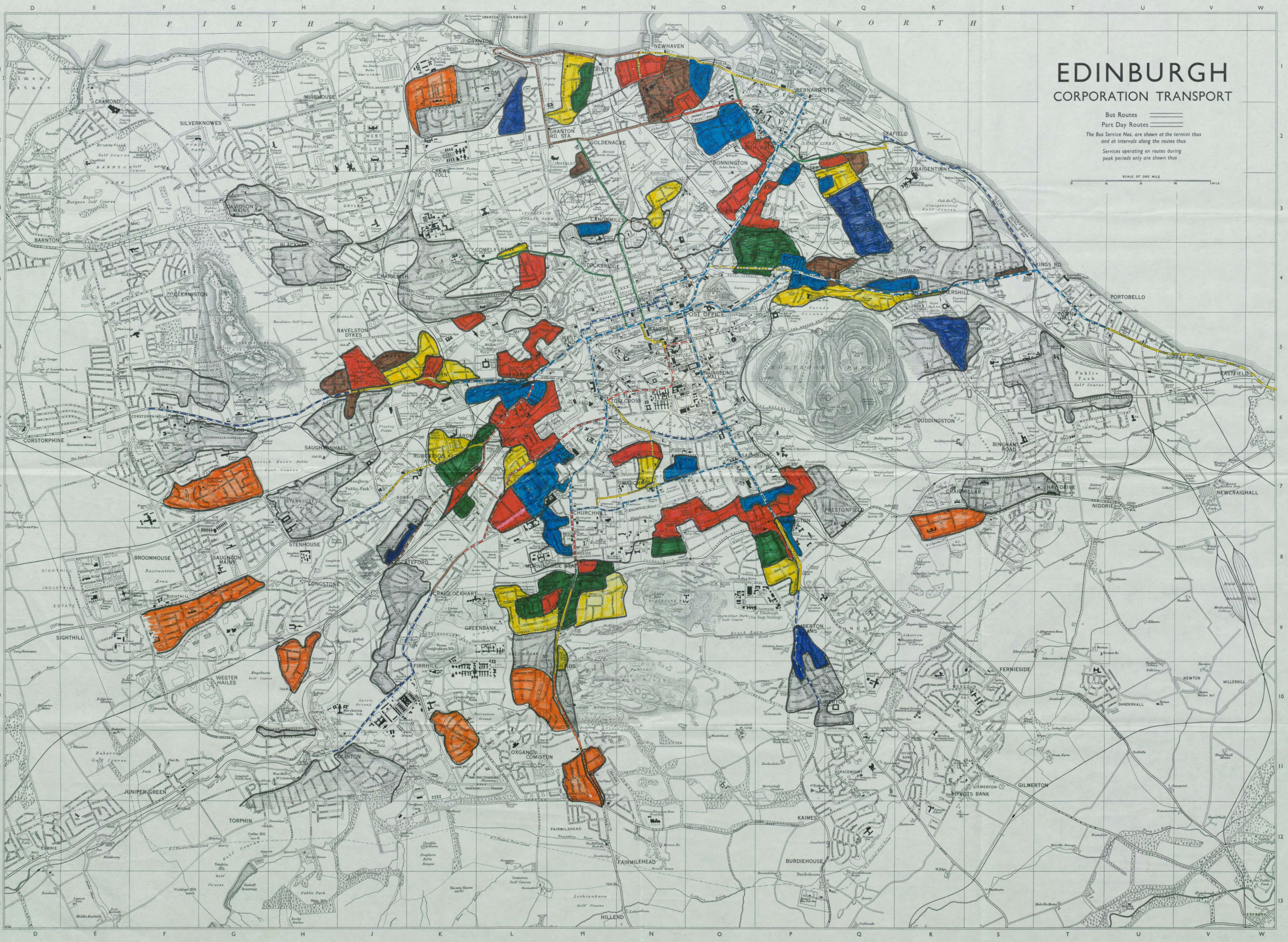
Areas of significant build- ing in any one decade Tramlines opened in each five- year period

Colour Code	Code No	Years	Years	Colour Code	Years	Colour Code
MAPS 1 & 2 Edinburgh and Glasgow						
	1	1866-75			1870-75	
	2	1876-85	1876-80		1881-85	
	3	1886-95	1886-90		1891-95	
	4	1896-1905	1896-1900		1901-1905	
	5	1906-15	1906-10		1911-15	
	6	1916-25	1916-20		1921-25	
MAP 1 - Edinburgh only						
	7	1926-35	1926-30		1931-35	
	8	1936-40	1936-40			
MAP 2 - Glasgow only						
	7	1926-40	1926-29		1930-40	

ERRATA (GLASGOW)
(in Ochojnas Map)


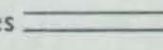
- ①. He has inserted the Buchanan Street line - which was never built.
- ②. He has omitted the Union Street - Renfield Street line (the first to be built).
- ③. He has omitted the Hyndland Road to Great Western Road line.
- ④. He has extended the Gordon Street line through to Buchanan Street (it terminated at Mitchell Street).
- ⑤. He has omitted the Keppochhill Road Route from the Mosshouse to Springburn Road.
- ⑥. He has inserted a line along West George Street to Queen Street Station, thence up Dundas Street to Parliamentary Road - which was never contemplated, nor built.
- ⑦. He has projected the Springburn Road to Bishopbriggs line beyond the Cross at Bishopbriggs and up the Kivlinthlock Road as far as the South Crosshill Road junction, instead of turning west at the Cross to terminate in Kenneth Avenue.
- ⑧. He has omitted the London Road extensions out to, and beyond Carnyle.

Struan J. T. Robertson.

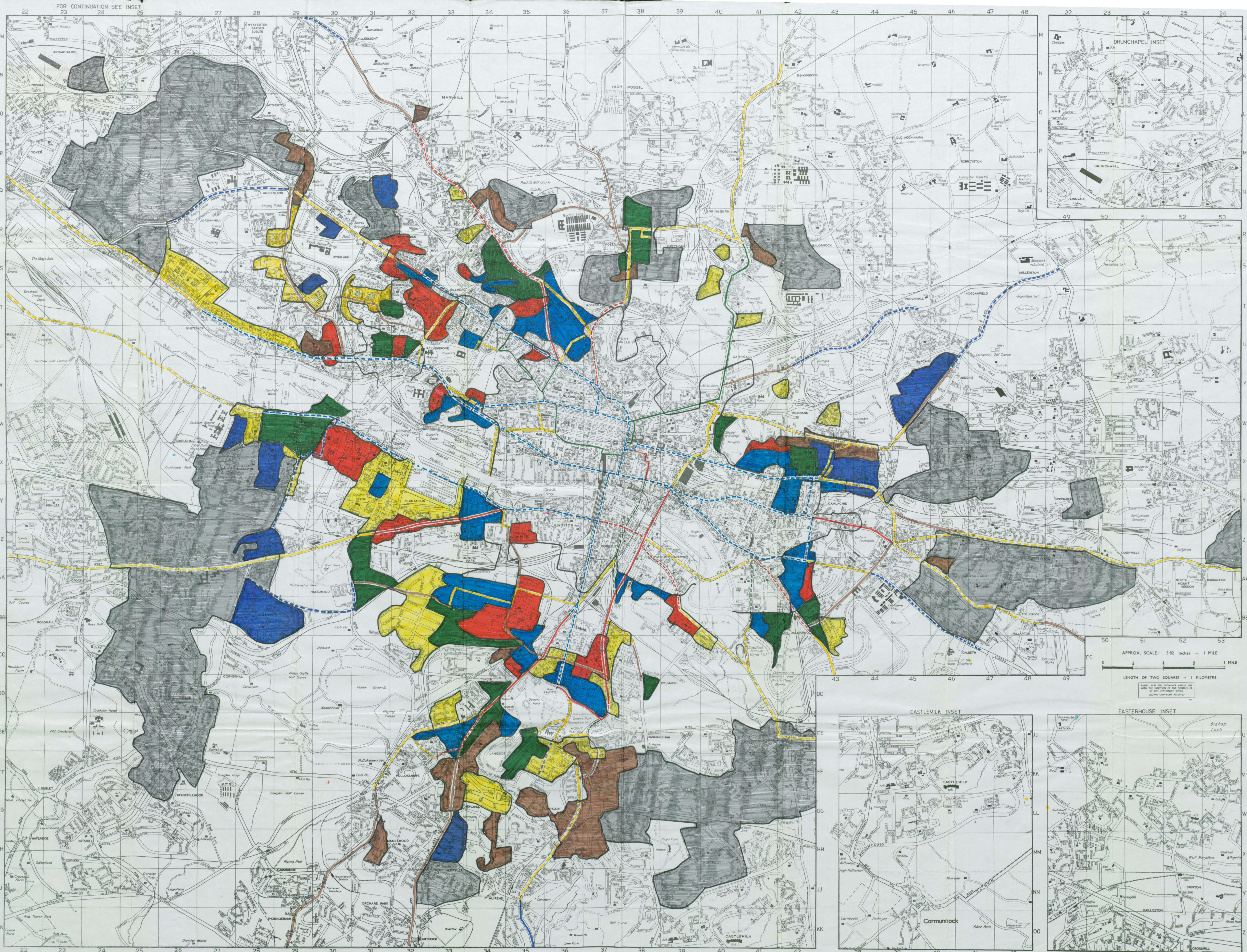


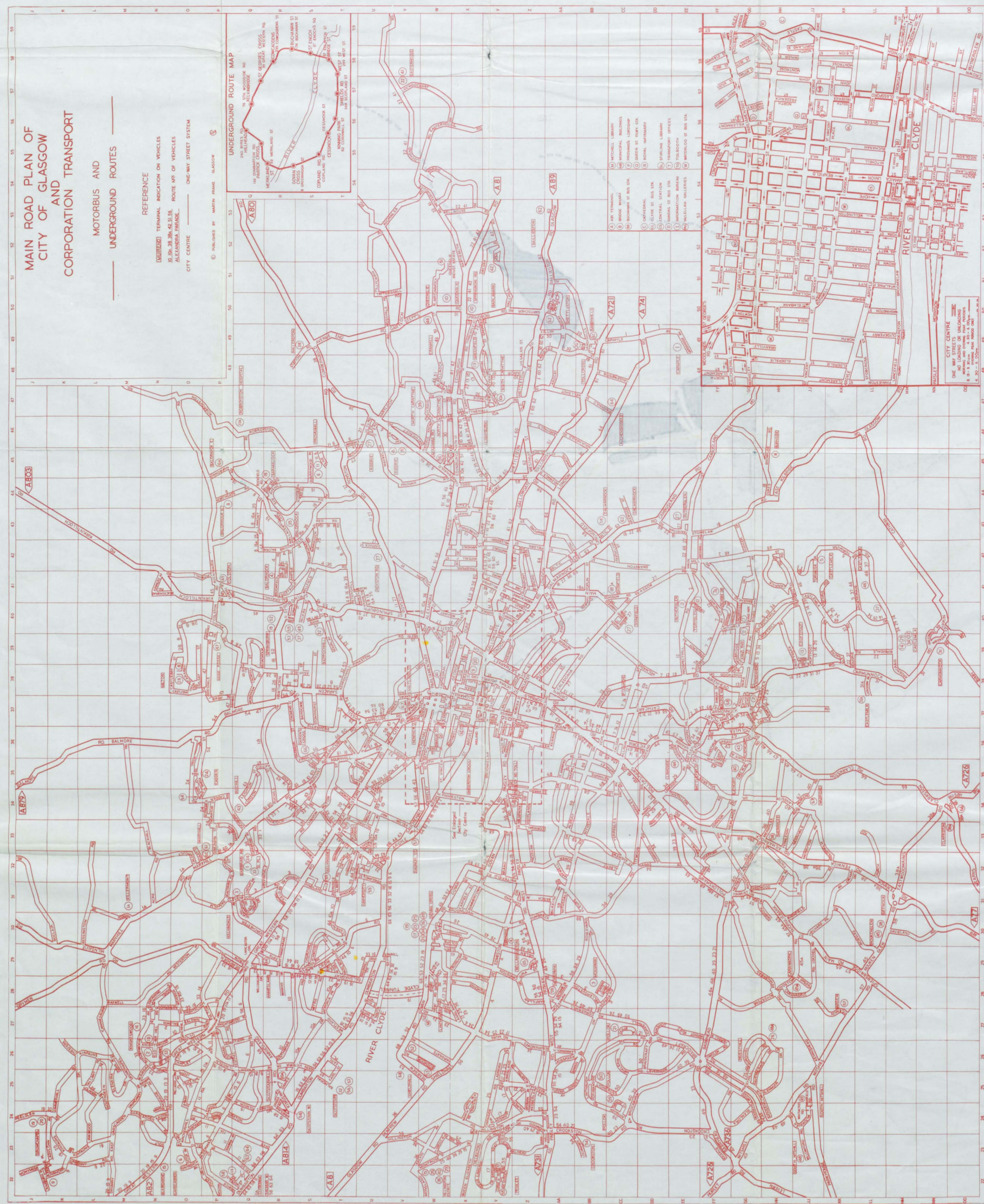
EDINBURGH

CORPORATION TRANSPORT

Bus Routes 
Part Day Routes 
The Bus Service Nos. are shown at the termini thus
and at intervals along the routes thus
Services operating on routes during
peak periods only are shown thus

SCALE OF ONE MILE
0 1/4 1/2 3/4 1 MILE





Latest Revised Edition

Map 2 Glasgow
The growth of the city
its tramways 1865-1940

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of
PLAN
OFFICIAL STREET AND TRANSPORT

CITY OF GLASGOW CORPORATION TRANSPORT

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